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Biblio

SECTION I.

BIBLIOGRAPHY OF THE APPLICATIONS OF

ELECTRO-OPTIC TECHNIQUES TO BIOLOGICAL PROBLEMS

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PREFACE

What the Bibliography Includes

This bibliography includes some 3,000 references collected from material available at the libraries of the Academy of Medicine, The Rockefeller Institute, and Columbia University, all of New York City. In selecting references emphasis has been on fields related to, or directly connected with, the application of electro-optical methods to certain biological or medical problems. Attention was also paid to techniques and methods, as it was thought that these would be of special interest to the biologist working in this field.

What the Bibliography Does Not Include

Because of the limits in time the survey was not made as complete as would be desirable. Certain essential material not available in the libraries of New York City had to be omitted. Books on radiation have been included only in relatively few cases.

Only a small amount of material on chlorophyll, fungi, yeast and protozoa was included; and because of the extensive summaries and bibliographies already available on vitamins, that subject has been touched only in review articles. Under the head of general applications only a limited number of entries were made since the material would otherwise have become too extensive.

In general, neither the list of references nor the abstracts accompanying them are put forward with any claim of completeness. No attempt was made to abstract articles which did not lend themselves to brief summary. These, together with articles important in themselves but not directly connected with the task in hand, were omitted. The aim was merely to give an indication of

ESSAYS

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certain phases of the work which appear important in the rapidly opening field with which this survey deals.

The Organization of the Bibliography

The entries of this bibliography could be arranged either in terms of the field of application (that is, the biological or chemical entity being studied), or in terms of the electro-optic technique used in the study. The biologist or the doctor would be primarily interested in the former classification; the physicist or chemist would perhaps be more interested in the latter.

The former choice has been made. The entire group of entries of the bibliography are numbered consecutively, but they are arranged in alphabetical order under the headings of the outline presented on page number iv. This scheme was followed partly to promote clarity but also to make it possible to distribute the bibliography in separate sections. An investigator interested only in articles dealing with a single subject would need to receive only the section dealing with that subject.

In dividing the subject matter into various fields of application every effort was made to arrive at a short and clear classification. To avoid an unwieldly and cumbersome outline, partition of subject matter was made with an eye to "Übersichtlichkeit" rather than on the basis of an extensive and strictly logical division. Agents such as bacteriophages, toxins and antibodies, although not necessarily related, have for convenience been grouped together. This juxtaposition is not to be taken as a pronouncement concerning the nature of these agents. Many titles referring to the above agents have also been entered under some other classification such as, for example, "Proteins". Although the agent may not actually belong to this group, it is put there because its action may depend in some intimate way on the action of substances in this group.

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OUTLINE OF BIBLIOGRAPHY

Fields of Application of Electro-Optic Techniques

A. Body fluids and tissues

a. Water
b. Blood
c. Blood Serum
d. Urine
e. Spinal fluid, bile, synovial fluid, etc.
f. Body tissues, including cancer
g. Isolated tissue cultures
h. Chromosomes

B. Enzymes (Ferments)

C. Vitamins

D. Hormones

E. Chlorophyll

a. Chlorophyll proper
b. Other botanical applications

F. Other Biologically Important Compounds

a. Proteins and aminoacids
b. Pigments, including blood pigments and their constituents
c. Other compounds

G. Microorganisms, toxins, antibodies, etc.

a. Viruses
b. Bacteriophage, toxins, antibodies, etc.
c. Bacteria
d. Fungi
e. Yeasts
f. Protozoa
g. Other organisms

H. Other Applications

a. General applications, emphasizing technique
b. Photochemical discussions
c. General reviews and philosophical discussions

Explanation of Cross References, etc.

At the bottom of each entry in the bibliography, on a separate line, occur certain letters and figures. Entry number 185, for example, "The Site of the Formation of Bilirubin" occurs under the heading A, b.- Body Fluids and Tissues, Blood of the main outline on page v. At the end of this entry occur the symbols:

A,d,e; F,b; H,a; I,1,2: (2).

The capital and small letters indicate topics other than the main one which are touched upon or treated subordinately in the reference concerned. That is, in addition to the main topic, the article also deals with A. Body Fluids and Tissues, d. Urine, e. Spinal Fluid, Bile, Synovial Fluid, etc; F. Other Biologically Important Compounds, b. Pigments, Including Blood Pigments and Their Constituents; H. Other Applications, a. General Applications, Emphasizing Technique.

The Roman and Arabic numerals which follow the letters indicate the physical technique employed in the research in question. For the present purposes, the principal electro-optic methods used in biological investigation have been classified as shown on the following page.

Electro-Optic Techniques Used in Biological Investigations

I. Absorption Effects

1. General absorptions
2. Absorption bands
3. Fine structure
4. Effect of absorbed light on materials
5. Photodynamic effects

II. Emission effects

1. Emission spectra
2. Fluorescence
3. Luminescence
4. Phosphorescence
5. Mitogenetic rays

III. Scattering

1. Primary
2. Secondary (Raman)

IV. Optical Rotation

1. Plane polarized
2. Circularly polarized
3. Elliptically polarized

V. Other Magneto and Electro-Optical Methods

1. Allison method
2. Refractive index
3. Dichroism and other methods

VI. X-Rays

1. Analytical
2. Effect of x-rays

VII. Other Procedures

Thus, in the case of the entry being discussed (number 185), the numbers I,1,2 indicate that the paper reports work making use of I. Absorption Effects, 1. General Absorption and 2. Absorption Bands.

It remains to discuss the figure within parentheses, which occurs at the end of the line of symbols quoted above. This figure indicates a classification of the importance of the article as viewed in this survey. Six groups have been recognized:

(1) Papers which are judged to be of fundamental or first importance, reporting findings that seem fully established:

(2) Papers which are potentially of great importance, but which may contain controversial material;

(3) Papers which from the point of view of the survey seem to be of moderate importance;

(4) Papers which present summaries of a considerable amount of work;

(5) Papers whose interest or importance is largely historical;

(6) Other papers.

Thus paper 185 is judged to be, from the point of view of this survey, a paper of real importance, but one which presents findings which are perhaps not yet fully substantiated. Any such judgement presents great difficulties, and must not be taken too seriously. "Importance" is an elusive, rapidly changing, and variously interpretable criterion. To one working in a specialized field, a paper which answers an immediate and pressing question is obviously a most important paper. Here, however, an attempt is made to judge importance on the basis of the probable criterion of advance in the whole range of application of electro-optic methods to biological problems.

Thus, to sum up the explanation of the symbolism of the bibliography, each reference is accompanied by a line of symbols indicating first, additional

subject matter also treated in the article; secondly, the techniques employed in the research in question, and thirdly, classification from the point of view of importance of this survey.

At the end of each section of the bibliography occurs a list of cross references indicating the further articles in other sections of the bibliography which treat in a secondary manner with the subject of the section concerned.

At the end of the entire bibliography there is a cross reference index by techniques showing which references, indicated by number, deal with any specific technique concerned. In this way a reader interested in any particular technique could, with the entire bibliography at hand, select whatever articles bear directly on the technique concerned.

WAVE LENGTH UNITS

The wave lengths of radiations are variously measured in centimeters (cm.), in millimeters (mm.), in microns (μ), in millimicrons ($m\mu$ or $\mu\mu$), and in Ångstroms (Å). The so-called "wave number" is the reciprocal of the wave length as measured in centimeters.

$$1\mu = 10^{-3} \text{ mm.} = 10^{-4} \text{ cm.} = 10^{3}\ m\mu = 10^{4} \text{ Å}$$

$$1m\mu = 1\mu\mu = 10^{-7} \text{ cm.} = 10^{-3}\mu = 10 \text{ Å}$$

$$1 \text{ Å} = 10^{-7} \text{ mm.} = 10^{-8} \text{ cm.} = 10^{-1}m\mu = 10^{-4}\mu$$

In the following bibliography all infra-red wave lengths are expressed in microns (μ); while all visible, ultra-violet, and X-ray wave lengths are expressed in Ångstroms (Å).

WAVE LENGTH RANGES FOR VARIOUS TYPES OF RADIATIONS

Type of Radiation		Wave Length Range Expressed in Various Units			
		cm.	μ	$m\mu$	Å
Hertz or Electric Waves	From	Infinity	-		
	To	10^{-2}	100.	100,000.	1,000,000.
Infra-red or Heat Rays	From	3×10^{-2}	300.	300,000.	3,000,000.
	To	7.6×10^{-5}	.76	760.	7,600.
Visible Rays	From	7.6×10^{-5}	.76	760.	7,600.
	To	4.0×10^{-5}	.4	400.	4,000.
Ultra-violet Rays	From	4.0×10^{-5}	-	400.	4,000.
	To	4.0×10^{-7}	-	4.	40.
X-rays	From	1.0×10^{-6}	-	10.	100.
	To	2.0×10^{-10}		.002	.02
γ Rays	From	7.0×10^{-8}	-	.7	7.
	To	6.0×10^{-10}	-	.006	.06
Cosmic Rays		10^{-11}			

NOTE ON ERRATA

Certain inconsistencies in spelling of authors' names, in initials, and in the alphabetizing of foreign names beginning with particles (de, le, van, von, etc.) have been noted in the bibliography and corrected in the list of authors (pages 477 to 523) which was prepared after the rest of the volume had been mimeographed. This author list supplements the bibliography, in so far as it alphabetizes the collaborating authors.

A. BODY FLUIDS AND TISSUES

a. Water

1. Aschkinass, E.
Über das Absorptions-spektrum des flüssigen Wasser, u.s.w. Ann. der Physik, 55:401-432, 1895.
One of the few papers on the absorption spectrum of water.
I,1,2; (3).

2. Birge, E.A. and Juday, C.
Transmission of solar radiation by the waters of inland lakes. Wisc. Acad. Sc., Arts and Letters, 24:509-580, 1929.
First report on absorption of light by waters of inland lakes.
H,a; I,1,2; (2).

3. Birge, E.A. and Juday, C.
A second report on solar radiation and inland lakes. Tr. Wisc. Acad. Sc., Arts and Letters, 25:285-335, 1930.
Absorption of solar light by lake water studied by means of thermopile and filters.
H,a; I,1,2; (3).

4. Birge, E.A. and Juday, C.
A third report on solar radiation and inland lakes. Tr. Wisc. Acad. Sc., Arts and Letters, 26:385-425, 1931.
Work done with an improved pyrlimnometer.
I,1,2; (2).

5. Birge, E.A. and Juday, C.
Solar radiation and inland lakes. Fourth report. Observations of 1931. Tr. Wisc. Acad. Sc., Arts and Letters, 27:523-562, 1932.
I,1,2; (2).

6. Cluzet, J. and Kofman, T.
Sur les mesures d'absorption de l'ultra-violet au moyen de la cellule photo-électrique au cadmium. Compt. rend. Soc. de biol., Paris, 104:195-197, 1930.
A photo-electric method for the determination of the absorption of mineral water, metal-colloidal suspensions, distilled water, as well as the skin of animals.
A,f, F,c,b, H,a; I,1,2; (3).

7. Dargent, C.S.
Análisis espectográfico de las aguas mineromedicinales españoles. Progresos de la clin., 39:602-609, 1931.
I,1,2, II,1; (3).

8. Dawson, L.H. and Hulburt, E.O.
The absorption of water for wave-lengths from 4400 to 2000 Å. Physical Rev. 45:757, 1934. (Short abstract of a paper).
The absorption coefficient of chemically pure, fairly dust-free water was measures by photographic photometry using tubes of water up to 272 cm. long; γ defined by $i - i_0 e^{-\gamma x}$, where x is in cm., was 0.8, 1.4, 2.2, 4.3, 7.1, 13.5 and 80 X 10^{-3}, at wave lengths 4400, 4000, 3600, 3200, 2800, 2400 and 2000Å, respectively. The values were more than 15 times those calculated from molecular scattering.
I,1,2, III,1; (2).

9. Duclaux, J. and Jeantet, P.
Dispersion de l'eau dans l'ultra-violet. J. de physique et radium, 2:346-350, 1921.
V,2; (2).

10. Duclaux, J. and Jeantet, P.
Dispersion de l'eau dans l'ultra-violet. J. de physique et radium, Série 6, 5:92-94, 1924.
Dispersion of pure water in the ultra-violet is investigated.
V,2; (2).

11. Duclaux, J. and Jeantet, P.
Transparence des eaux naturelles aux rayons ultra-violets. Compt. rend. Acad. d. sc., 181:630-631, 1925.
Chemically pure water to a depth of 10 cm. is transparent to rays of a wave length of 1900 Å. The minerals in the quantities normally found in so-called pure waters do not reduce this transparency, mineral waters excepted. Substances found in polluted or stagnant water reduce its transparency, which is also affected in well water. Nitrates and nitrites have the same absorption spectrum, though only nitrates can be considered as innocuous. (Physiol. Abstr.)
I,1,2; (2).

12. Duclaux, J. and Jeantet, P.
Transparence des eaux pour les rayons ultra-violets. Ann. Inst. d'hydrol., 6:241-262, 1930.
Absorption of ultra-violet light by pure and contaminated water.
I,1,2; (2).

13. Fresenius, L.
Über die Bestimmung des Caesiums und Rubidiums, insbesondere in Mineralwässern. Ztschr. f. analyt. Chem., 86:182-190, 1931.
Spectral analysis of caesium and rubidium in complicated salt mixtures and solutions.
H,a; II,1; (3).

14. Harvey, H.W.
Biological chemistry and physics of sea water. University Press. Cambridge. 1928. 194 p.
Good review of work on sea water.
I,1, 2, 4; (4).

15. Ivekoric, H.
Fluorescenz des Wassers im filtrierten ultravioletten Licht als Indicator der Verunreinigung. Ztschr. f. Hyg. u. Infektionskr. 112:54-61, 1931.
Most natural waters show bluish white fluorescence.
II,2; (6).

16. Jansen, W.H. and Heyes, J.
Die Anwendung des Spektralanalyse zur quantitativen Bestimmung von Alkalien und Erdalkalien. Ztschr. f. physiol. Chem., 211:75-87, 1932.
Sodium, lithium, potassium, and calcium determined spectroscopically in a mineral water. Flame excitation used. Results check with chemical method.
II,1; (2).

17. Kofman, T.
Pouvoir diffusant des rayons ultra-violets sur quelques milieux liquides. Compt. rend. Soc. de biol., 110:845-847, 1932.
Reflection of light from quartz mercury vapor lamp from the surface of many liquids, colorless and colored, including water determined with photo-electric cell.
F,c; I,4, V,2; (6).

18. Lange, B.
Die Lichtabsorption des Wassers im sichtbaren Spektralgebiet. Ztschr. f. physiol. Chem. Abt. A, 159:303-305, 1932.
Water was examined in 50 cm. tubes with a double monochrometor and a photo-electric cell. Maxima at λ 6000, 6600 and 7500 Å. Increased absorption in the short wave-lengths can be accounted for by the impurities in the water. Important only for contaminated water.
I,1,2; (2).

19. Merker, E.
Die Fluoreszenz der von Pflanzen und Tieren bewohnten Gewässer und ihre verminderte Lichtdurchlässigkeit. Naturwissensch., 19:433-435, 1931.
I,1,2, II,2; (6).

20. Palezza, C. and Donati, A.
Analisi spettrografica di alcuni residui di acque minerali. Ann. di chim. appl., 15:535-542, 1925.
Residue of mineral water investigated spectrographically for presence of different elements.
II,1; (6).

21. Pearsall, W.H. and Hewitt, T.
Light penetration into fresh water. II. Light penetration and changes in vegetation limits in Windermere. J. Exper. Med., 10:306-312, 1933.
I,1; (3).

22. Pearsall, W.H. and Ullyott, P.
Light penetration into fresh water. I.A thermionic potentiometer for measuring light intensity with photo-electric cells. J. Exper. Biol., 10:293-305, 1933.
I,1,2; (3).

23. Pietenpol, W.B.
Selective absorption in the visible spectrum of Wisconsin lake waters. Tr. Wisc. Acad. Sc., Arts and Letters, 19:562-593, 1918.
I,1,2; (5).

24. Poole, H.H. and Atkins, W.R.G.
Further photo-electric measurements of the penetration of light into sea water. J. Mar. Biol. A., U. Kingd., 15:455-483, 1928.
I,1,2; (2).

25. Poole, H.H. and Atkins, W.R.G.
Photo-electric measurements of submarine illumination throughout the year. J. Mar. Biol. A., U. Kingd., 16:297-324, 1929.
I,1,2; (2).

26. Rao, R.I.
Raman effect for water in different states. Lond., Edinb. a. Dublin Phil. Mag. A. J. Sc., 17:1113-1134, 1934.
Possible explanations for shift in Raman lines of water in different states.
III,2; (3).

27. Schade, H. and Lohfert, H.
Über den Ultraviolett-Tyndallkegel des reinen Wassers. Kolloid-Ztschr., 51:65-71, 1930.
Pure distilled water showed Tyndall cone which increased in intensity at lower temperatures.
I,1,2, III,1; (2).

28. Shelford, V.E. and Gail, F.W.
A study of light penetration into sea water, etc. Pub. Puget Sound Biol. Sta., 3:141-175, 1922.
I,1,2; (3).

29. Suhrmann, R. and Breyer, F.
Der Einfluss gelöster Substanzen auf das ultrarote Absorptionsspektrum des Wassers. Naturwissensch., 19:772-773, 1931.
Note on change of absorption band of water at λ 1.2μ when different materials are dissolved in it.
I,1,2; (3).

30. Suhrmann, R.
Ultrarote Spektraluntersuchungen über die Änderung des Polymerisations-gleichgewichtes des Wassers durch gelöste Elektrolyte. Ztschr. f. Elektrochem. angew. physik. Chem., 38:627-628, 1932.
In the near infra-red (λ0.8 - 2.3μ) the absorption bands which come from the dissociation of water increase with temperature and by the addition of electrolytes in high concentration. Effect of the electrolytes increases with the radius of the ions. H-ions may bind the more strongly dissociated parts of water so tightly that new bands are created.
I,1,2; (2).

31. Tanner, F.W. and Geen, H.
Residual germicidal action of water and plain agar after exposure to ultra-violet light. Proc. Soc. Exper. Biol. & Med., 28:291-293, 1930.
Results do not definitely establish whether ultra-violet light affects water and agar so that bacteria do not grow in them.
F,a, G,c; I,4; (3).

32. Tsukamoto, K.
Comparaison entre l'absorption par l'eau et celle par les quartz dans l'ultra-violet lointain. Rev.d'opt., 7:89-108, 1928.
I,1,2; (3).

33. Walker, W.F. and Pryer, R.W.
Bactericidal action of water treated by ultraviolet rays. Am. J. Pub. Health, 2:703-706, 1921.
Water treated with ultra-violet light has a residual bactericidal action.
G,e; I,4; (3).

See also:

492, 557, 615, 2009, 2030, 2315, 2392, 2485, 3236, 3300.

A. BODY FLUIDS AND TISSUES

b. Blood

34. Abderhalden, E. and Schmid, J.
Bestimmung der Blutmenge mit Hilfe der "optischen Methode". Ztschr. f. physiol. Chem., 66:120-127, 1910.
H,a; IV,1; (6).

35. Akovbjanz, G. and Gamburzev, V.
Über die Absorptionsspektra des Blutes von Homo sapiens, Bos domesticus und Rana temporaria. (Russian) J. eksper. biol. i med., 4:751-761, 1927.
Absorption spectra of blood of Homo sapiens, bos domesticus and rana temporaria. (Ber ges. Physiol.)
I,1,2; (6).

36. Amano, S. and Ishikawa, T.
Studien zur Pathologie der Körperflussigkeiten mittels Spektrographie usw. Tr. Jap. Path. Soc., 23:389-406, 1933.
Absorption spectra of blood in ultra-violet were determined for cholemia, uremia, pneumonia, sarcoma of different animals, and goat serum.
A,c,e; I,1,2; (3).

37. Araki, T.
Über den Blutfarbstoff und seine näheren Umwandlungsprodukte. Ztschr. f. physiol. Chem., 14:405-415, 1890.
Historical interest.
I,1,2; (5).

38. Arnold, V.
Ein Beitrag zur Spektroskopie des Blutes. Zentralbl. f. d. med. Wissenschr., 28:465-468, 1899.
F,b; I,1,2; (5).

39. Arnold, V.
Ein Beitrag zur Spektroskopie des Blutes. Ztschr. f. physiol. Chem., 29:78-85, 1900.
Production and absorption spectrum of neutral hematin solution. See later papers by other authors for more detailed investigation.
F,b; I,1,2, (5).

40. Aron, H.
Über die Lichtabsorption und den Eisengehalt des Blutfarbstoffes. Biochem. Ztschr., 3:1-25, 1907.
Iron content of blood pigments is of constant size only if exterior environment of animal are kept entirely constant. Early paper with a large number of references on work conducted before 1905.
F,b; I,1,2; (4).

41. Aron, H. and Müller, F.
Über die Lichtabsorption des Blutfarbstoffs. Arch. f. Physiol., Suppl. 1:109-132, 1906.
F,b; I,1,2; (5).

42. Aron, H. and Müller, F.
Über die Lichtabsorption des Blutfarbstoffes. Ztschr. f. physiol. Chem., 50:443-444, 1907.
Polemic against R. v. Zeynek.
F,b; I,1,2; (5).

43. Aszódi, Z.
Über die Darstellung von kristallisiertem Hämoglobin aus Menschenblut. Biochem. Ztschr., 252:212-214, 1932.
Description of a method of preparation of crystallized hemoglobin.
F,b; I,1, VII; (6).

44. Audo-Gianotti, G.B. and Rivolta, C.
Ricerche sulla glicemia sperimentale durante l'azione di sostanze fotodinamiche. (Investigations about Experimental Glycemia under the Influence of Photodynamic Substances.) Riforma med., 49:783-786; 1933.
Twelve people under the influence of injection of trypaflavine or quinine sulphate showed a lowering of the blood sugar curve. Possible effect on insulin secretion is discussed. Clinical importance.
D; I,4; (3).

45. Austin, J.H. and Drabkin, D.L.
A technique for the spectrophotometrique study of undiluted blood. J. Biol. Chem., 100:X, 1933.
A cell is designed which permits the taking of absorption spectra of undiluted blood in the absence of gases.
F,b; H,a; I,1,2; (3).

46. Autenrieth, W.
Die Auffindung der Gifte und stark wirkender Arzneistoffe. Tübingen: J.C.B. Mohr Verlag, pp. 286, 1909.
Book contains a short chapter on the detection of blood and blood stains by means of the spectrograph.
F,b; I,1,2; (6).

47. Balthazard, M.O.
Détermination spectrométrique du coefficient d'empoisonnement dans l'intoxication oxycarbonée. Bull. Soc. Chim. biol., 6:817-828, 1924.
Author believes that it is possible to use the displacement of the absorption band when O_2 haemoglobin is changed to CO-haemoglobin as an indication of the CO present in the blood.
F,b; I,1,2; (3).

48. Barcroft, J.
Das Hämoglobin und seine biologische Bedeutung. Naturwissensch. 17:261-269, 1929.
Good review of the properties of haemoglobin. (65 references.)
F,b; I,1,2; (3).

49. Barkan, G.
Über Bestimmungsmethodik und Eigenschaften des "leicht abspaltbaren" Bluteisens. VI. Mitt. in der Reihe der Eisenstudien. Ztschr. f. physiol. Chem., 216:1-16, 1933.
Chemical paper.
A,c; F,b; VII; (6).

50. Bendien, W.M. and Snepper, T.
Zusammenhang zwischen der Senkungsgeschwindigkeit der roten Blutkörperchen und dem Eiweissspektrum. Biochem. Ztschr., 235:14-34, 1931.
General physiological and clinical paper.
F,a; VII; (6).

51. Berg, F.R. and Schwarzacher, W.
Die Lage des Violettstreifens bei Oxy- und Kohlenoxydhämoglobin. Ztschr. f. physiol. Chem., 190:184-188, 1930.
Violet absorption band in oxyhemoglobin is at λ 4137 Å and in CO hemoglobin at λ 4180 Å. No difference in wave length of these bands for different animals. Excellent photographs.
F,a; H,a; I,1,2; (3).

52. Bergh, van den H.
Enterogene Cyanose. Deutsches Arch. f. klin. Med., 83:86-106, 1905.
Clinical importance.
F,b; I,1,2; (6).

53. Bertin-Sans
Sur le spectre de la méthémoglobine acide. Compt. rend. Acad. d. sc., 106:1243-1245, 1888.
Early paper on absorption spectrum of methaemoglobin.
F,b; I,1,2,4; (5).

54. Biddau, I.
Studio sulle radiazioni mitogenetiche del sangue del bambino. I. Ricerche sul neonato e lattante con speciale riguardo al potere radiante del sangue materno. Radiobiologia 1:3-17, 1932.
Blood radiation of newborn children same as their mothers'. Later blood-radiation declines. In rachitis, dystrophy, tuberculosis, and chronic eczema the radiation is lower. Large number of tables and many details.
II,5; (4).

55. Bingold, K.
Über Blutfarbstoffabbau und Ikterus sowie über die diagnostische Bedeutung des "Hämatins" im strömenden Blut. Verhandl. d. 34. Kongr. der Deutsch. Gesellsch. f. inn. Med., Wiesbaden, Vol. 34:55-59, 1922.
F,b; I,1,2; (6).

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Blood urobilin. The urobilin content of normal human blood. Description of a method. J. Biol. Chem., 80:477-485, 1928.
Method for detection of urobilin by comparing the suspension with a colored standard solution.
H,a; I,1,2; (3).

57. Blum, H.F.
Studies of photodynamic action. II. The relationship between hemolysis by irradiated and non-irradiated eosine. Biol. Bull., 59:81-94, 1930.
Photodynamic action may probably be regarded as summation of effects of non-irradiated photodynamic substance together with oxydative changes brought about by this substance, due to irradiation.
F,b; I,4,5; II,2; (3).

58. Bohr, C.
Über die Verbindung des Hämoglobins mit Sauerstoff. Skandinav. Arch. f. Physiol., 3:76-100, 1892.
F,b; I,1,2; (5).

59. Bohr, C.
Über den specifischen Sauerstoffgehalt des Blutes. Skandinav. Arch. f. Physiol., 3:101-144, 1892.
F,b; I,1,2; (5).

60. Brainess, S.
Die mitogenetische Strahlung als Methode zum Nachweis und Analyse der Ermündungserscheinungen. Arbeitsphysiol., 6:90-104, 1932.
Mycetocrit method of determining mitogenetic radiation effects described. Believes the mitogenetic radiation method is well suited to study of organic changes produced by "work".
A,f; H,a; II,5; (3).

61. Braunstein, A.E. and Heyfetz, P.A.
Glykolyse und die mitogenetische Strahlung des Blutes bei experimentalem Carcinom. Biochem. Ztschr., 259:175-179, 1933.
Authors do not believe that disappearance of M.G.R. from blood of carcinomatous persons is shown by decline of glycolysis in the blood, but by the appearance of substance which absorbs this radiation.
A,f; II,5; (3).

62. Brugsch, and Yoshimato
Zur Frage der Gallenfarbstoffbildung aus Blut. Ztschr. f. exper. Path. u. Therap., 8:639-644, 1911
A,e; F,b; I,1,2; VII; (6).

63. Buraczewski, J. and Marchlewski, L.
Zur Kenntnis des Blutfarbstoffs. III. Ztschr. f. physiol. Chem., 43:410-414, 1905.
F,b; I,1,2; (3).

64. Buraczewski, J. and Marchlewski, L.
Zur Kenntnis des Blutfarbstoffs. VI. Ztschr. f. physiol. Chem., 47:331-334, 1906.
Chemical investigation of blood pigments.
F,b; I,1,2; (3).

65. Burckhardt, E.
Blutcalcium bei Tuberkulösen. Seine Beeinflussung durch Lebertran, Höhensonne und Solganal. Schweiz. med. Wchnschr., I:68-71, 1933.
G,c; I,4; (3).

66. Busck, G. and Tappeiner, H. v.
Über Lichtbehandlung blutparasitärer Krankheiten. Deutsches Arch. f. klin. Med., 87:98-110, 1906.
Photodynamic action and blood diseases.
I,4,5; (5).

67. Butterfield, E.E.
Über die Lichtextinktion, das Gasbindungsvermögen und den Eisengehalt des menschlichen Blutfarbstoffs in normalen und krankhaften Zuständen. Ztschr. f. physiol. Chem., 62:173-225, 1909.
Extinction coefficient, iron content, and ability to absorb gases of human hemoglobin are constant not only for blood of normal people but also for blood of persons with the following diseases: polycythemia, pernicious anemia, chlorosis, scurvy, pseudoleukemia.
F,b; I,1,2; (5).

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Biological action of light, experiments on penetration and absorption. J. Physiol., 58:28, 1924.
General physiological effects of light from a carbon arc lamp.
H,c; I,4; (6).

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Spektrochemische Blutuntersuchung. Abderhalden's Handb. d. biol. Arbeitsmeth., Abt. IV., Teil 4, Heft 4, S. 1109-1147, 1926.
Review of application of spectroscopic test to blood investigation.
H,a; (4).

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Étude spectrophotométrique du sang oxycarboné. Applications médico-légales. pp. 118. Paris; Rueff et Cie, 1890.
Historical interest.
I,1,2; (5).

71. Citron, H.
Über den Nachweis kleinster Blutmengen in der klinischen und forensischen Medizin. Berl. klin. Wchnschr., 47:1001-1004, 1910.
Clinical importance.
H,a; I,1,2; (6).

72. Clementi, A. and Condorelli, F.
Sull'emolisi da falsa azione fotodinamica. Ann. di. clin. med. e med. sperim., 19:509-515, 1929.
The effect of light on the hemolysis of red blood corpuscles in the presence of a-glucocholate and ethyl alcohol is called pseudo-photodynamic action. A number of other substances were also investigated but did not show this effect. (Biol. Abstr.)
I,4,5; II,2; (3).

73. Dénes, A.
Über die Lichtabsorption des Globinhämochromogens und über seine Verwendbarkeit zur Bestimmung des Farbstoffgehaltes des Blutes. Biochem. Ztschr., 255:378-386, 1932.
Author found that horse, dog, and cat globinhemochromogens have the same absorption curves. The absorption curves of globinhemochromogen of cattle and human beings have a somewhat different absorption curve. Maximum light absorption is at λ 5558 Å and another maximum at 5271 A. The minimum is at λ 5400 Å. Author believes that one can calculate the pigment content of blood with the help of the absorption coefficient and by a Vierodt defined quotient A.
F,b; I,1,2; (2).

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On the nature of blood sugar. J. Biol. Chem., 60:604-612, 1924.
Authors were not able to verify the findings of Winter and Smith of the existence of γ-glucose in normal blood.
F,c; IV,1; (3)

75. Drabkin, D.L. and Austin, J.H.
Spectrophotometric studies of hemoglobin derivatives. J. Biol. Chem., 100:xxxvi-xxxviii, 1933.
See extensive paper for detailed discussion.
F,b; I,1,2; (3).

76. Drabkin, D.L. and Austin, J.H.
Spectrophotometric studies. I. Spectrophotometric constants for common hemoglobin derivatives in human, dog, and rabbit blood. J. Biol. Chem., 98:719-733, 1932.
A simple, reproducible, and adequate inorganic standard is suggested in order to standardize the spectrophotometric technique. Values of the absorption constant, A, for various hemoglobin derivatives in man, rabbit, and dog. A method for the quantitative spectrophotometric estimation of a mixture of two pigments whose A values are known. The danger of excessive dilution of blood for spectrophotometric measurement is demonstrated. (Authors' summary).
F,b; H,a; I,1,2; (3).

77. Dreyer, G. and Hanssen, O.
Sur la loi de vitesse d'hémolyse des hématies sous l'action de la lumière, de la chaleur et de quelques corps hémolytiques. Compt. rend. Acad. d. sc., 145:371-373, 1907.
Effect of ultra-violet light on hemolytic action.
F,b; I,1,2,4,5; (5).

78. Earle, W.R.
Studies upon the effect of light on blood and tissue cells. II. The action of light on erythrocytes in vitro. J. Exper. Med., 48:667-681, 1928.
When whole blood of a rabbit in a hanging drop was subjected to irradiation from certain light sources a striking degeneration of the white and of the red cells occurred. The effect of the light on the cells is discussed in detail.
I,4; (3).

79. Eidinow, A.
Über die baktericide Wirkung der ultravioletten Strahlen. Strahlentherapie, 25:730-734, 1927.
Further evidence that blood which had been exposed to the light of a quartz-mercury-vapor lamp acts bactericidally. Discussion of the effect of photodynamic substances and direct irradiation on the bacteria.
C, F,b; G,c; I,1,4,5; II,2; (3).

80. Eidinow, A.
The irradiation of the blood in vitro. J. of Path. & Bact., 33:769-782, 1930.
1. The irradiation of blood in vitro with rays emitted by a quartz-mercury-lamp (infra-red -λ2200 Å) produces: a. hemolysis of the red corpuscles, b. destruction of the leucocytes, c. alteration of hemoglobin into methemoglobin, d. alteration in fibrinogen and tissue kinase and delay of coagulation, e. destruction of hemolysins, complement amboceptors and agglutinins present in the blood serum. 2. The intravenous injection of "irradiated blood" a. increases the hemobactericidal power 1-3 hours after injection, b. increases the total number of leucocytes per ccm. The effect is due to the irradiation of the blood corpuscles, since "irradiated serum" and "irradiated lipoids" have no effect. 3. The intravenous injection of washed blood corpuscles, sensitized with eosin and exposed to visible rays, has a similar action to defibrinated blood irradiated with rays shorter than λ3300 Å. 4. The intravenous injection of 10-20 c.c. of defibrinated blood, intensively irradiated, is toxic to rabbits and causes death by intravascular clotting. In this respect the action is similar to that of cytotoxins and other endothelial cell poisons.
An interesting apparatus for the irradiation of large quantities of liquid suspensions.
A,c; I,4,5, II,2; (2).

81. Engelmann, H.
Einige Ergebnisse mikrospektrometrischer Untersuchungen von Blutlösungen. Arch. f. d. ges. Physiol., Suppl. Bd. 2:433-434, 1906.
Absorption coefficients for blood solutions.
I,1,2; (3).

82. Ernst, Z. and Förster, J.
Über die Bestimmung des Blutbilirubins. Klin. Wchnschr., 3:2386-2388, 1924.
A method for the determination of bilirubin in the blood. The color of the bilirubin is compared with a $KMnO_4$ standard. It is thus possible to determine less than 0.5 mg. bilirubin.
Clinical importance.
F,b; I,1,2; (3).

83. Fabre, R. and Simmonet, H.
Contribution à l'étude de l'hématoporphyrine. II. Etude de l'action photosensibilisatrice de l'hématoporphyrine sur les globules rouges. Bull. Soc. chem. biol., 8:61-66, 1926.
Action of different photodynamic substances including hematoporphyrin on blood corpuscles.
F,b; I,1,2,4,5, II,2; (2).

84. Fischer, H.
Über den Dualismus des Blutfarbstoffs und über Porphyrine. Strahlentherapie 18:185-200, 1924.
Interesting review article.
A,c,d, E,a, F,b; I,1,2,4,5, II,2; (4).

85. Fischer, H. and Bartholomäus, E.
Experimentelle Studien über die Konstitution des Blut-und Gallenfarbstoffes. II. Ztschr. f. physiol. Chem., 87:255-269, 1913.
Chemical studies about the structure of blood and bile pigment. Absorption spectra.
A,c,d,e; F,b; I,1,2; (3).

86. Formánek, J.
Über die Absorptionsspektra des Blutfarbstoffs. Ztschr. f. analyt. Chem., 40:504-523, 1901.
F,b; I,1,2; (5).

87. Genner, V.
Action des rayons chimiques de la lumière sur le pouvoir bactéricide du sang et du sérum. Compt. rend. Soc. de biol., 94:603-606, 1926.
Contradicotry results from those of Colebrook, Eidinow and Hill. Tested irradiated animal blood for its bactericidal action.
A,c; I,4; (3).

88. Gesenius, H.
Über die Gurwitschstrahlung menschlichen Blutes und ihre Bedeutung für die Carcinomdiagnostik. Biochem. Ztschr., 226-257-272, 1930.
Could verify findings of Gurwitsch and Salkind that blood of healthy people emits mitogenetic rays; whereas blood of people with pernicious anemia, cancer, etc. does not.
A,f; G,e; II,5; (3).

89. Gesenius, H.
Blutstrahlung und Carcinomdiagnostik. Radiobiologia, 1:33-36, 1932.
Blood mitogenetic radiation stops in early stages of cancer. In other diseases, such as, pernicious anemia, leukemia, lymphogranuloma, radiation also stops. Radiation not stopped by hypernephroma, sarcoma, glioma, and myoma.
A,f; II,5; (3).

90. Gesenius, H.
Zur Analyse der Blutfernwirkung nach Gurwitsch. Arch. f. Gynäk., 153:468-481, 1933.
Detailed discussion of author's technic. Preliminary report of results.
G,e; II,5; (2).

91. Gibbs, R.C., Johnson, J.R., and Shapiro, C.V.
Über die Absorptionsspektren des Blutes und ihre Beziehung zur Rachitis. Strahlentherapie, 41:161-168, 1931.
In contrast to Suhrmann and Kollath, authors could not find difference in absorption spectra of blood of healthy and diseased (rachitic) chickens. Believe increased absorption of Suhrmann caused by presence of small particles which caused increased scattering.
I,1,2; III,1; (3).

92. Gibbs, R.C., Johnson, J.R., and Shapiro, C.V.
The ultraviolet absorption spectrum of hemolyzed blood corpuscles in relation to rickets. Am. J. Physiol., 97:243-248, 1931.
Absorption spectra of hemolized solutions of red blood corpuscles of healthy and rachitic rats identical.
C; I,1,2; (3).

93. Girard, P. and Peyre, E.
Modifications de l'état colloïdal du plasma par certains colorants fluorescents. Compt. rend. Soc. de biol., 95:88-91, 1926.
Effect of injection of photodynamic substances.
A,f; F,b; I,1,4,5; II,2; (6).

94. Goldmann, H., Hepter, J., and Marchlewski, L.
Studien über den Blutfarbstoff. Ztschr. f. physiol. chem., 45:176-182, 1905.
F,b; I,1,2; (3).

95. Golischewa, K.P.
Die mitogenetische Spektralanalyse der Blutstrahlung am lebenden Tier. Biochem. Ztschr., 260:52-57, 1933.
Detailed spectrum of mitogenetic radiation of circulating blood of rabbit. Blood radiation has following components: glycolysis, breaking down of creatin and phosphate, phosphatase, oxydation, breaking down of peptide linkage, and one unknown component. Absolute zero experiments reported.
F,c; II,5; (2).

96. Golischewa, K.P.
Das mitogenetische Spektrum des fliessenden Blutes. Arch. di. sc. biol., 33:107-114, 1933.
Mitogenetic radiation of blood in vivo.
II,5; (3).

97. Goroncy and Urban
Quantitativer spektrographischen Nachweis von Kohlenmonoxyd im Blut. Ztschr. f. d. ges. exper. Med., 81:295-297, 1932.
Used Baily tube and large quartz spectrograph. Could recognize CO in blood down to 5%. Method not advisable for clinical work.
H,a; I,1,2; (3).

98. Gudzent, F.
Einwirkung von Strahlen und radioaktiven Substanzen auf das Blut. Strahlentherapie; 2:467-479, 1913.
Effects of light and radioactive substances on blood.
I,1,4,5; II,2; VI,2; (4).

99. Gurwitsch, L. and Salkind S.
Das mitogenetische Verhalten des Blutes Karzinomatöser. Biochem. Ztschr., 211:362-372, 1929.
Blood of carcinomatous mice and men loses mitogenetic properties. Shown with mice that mitogenetic radiation disappears soon after implantation of cancer. Disappearance of radiations caused by absence of enzymatic processes, usually present in blood of healthy animals.
A,f; II,5; (2).

100. Harris, D.T.
The action of light on blood. Biochem. J., 20:271-279, 1926.
Irradiation of blood with ultra-violet causes it to give up oxygen at high oxygen tension and to take up oxygen at low tension. At about 15 mm. there is an equilibrium. No change occurrs on passing from the dark into the light. The taking up of oxygen by blood in ultra-violet is a property of the plasma.
I,4; (2).

101. Harzbecker, O. and Jodlbauer, A.
Über den zeitlichen Ablauf der Hämolyse bei Belichtung sensibilisierter roter Blutkörperchen. Biochem. Ztschr., 12:306-313, 1908.
Hemoglobin is exuded slowly by the cell. Fluorescence will appear whether the fluorescing material is inside or outside the cell.
I,5; II,2; (5).

102. Hasselbach, K.A.
Untersuchungen über die Wirkung des Lichtes auf Blutfarbstoffe und rote Blutkörperchen wie auch über optische Sensibilisation für diese Lichtwirkungen. Biochem. Ztschr., 19:435-493, 1909.
Blood pigment transformed under the influence of light into methemoglobin, further to hematin, but only in presence of O_2. Light only effective if below λ 3100 Å. The methemoglobin formation a monomolecular reaction. Methemoglobin reduced by light in the absence of O_2 to hemoglobin. Hematin reduced in the presence of light to hemochromogen; in the dark, hematin formed again.
Blood corpuscles dissolved in the presence of light mostly λ 3100 Å, but also through visible light. Sensibilizers speed up the light reaction; in vacuo, however, only such reaction in which O_2 is separated. The sensibilizers play rôle of a light-absorbing, readily oxidizable material.
Material was stirred. Used entire lamp or filters with water cooling.
F,b; I,4; (2), (4).

103. Haurowitz, F.
Zur Chemie des Blutfarbstoffes. VII. Über das Verhalten der prosthetischen Gruppe in verschiedenen Lösungsmitteln. Ztschr. f. physiol. Chem., 169:235-262, 1927.
The spectea of hemin, mesohemin, dimethylmesohemin, aetiohemin and the respective hemochromogen determined spectrophotometrically in the presence and absence of cyanidine and pyridine. The spectrum of hemin in pyridine easily distinguished from that of hemochromogen. Mostly chemical discussion.
F,b; I,1,2; (2).

104. Haurowitz, F.
Zur Chemie des Blutfarbstoffes. XI. Das Hämoglobin des erwachsenen Menschen. Ztschr. f. physiol. Chem., 186:141-147, 1930.
Has no radiation part. Shows that blood of newborn infant contains 2 hemoglobin types. Chemical.
F,b; VII; (3).

105. Haurowitz, F.
Konstitution und biologische Eigenschaften des Blutfarbstoffes und seiner Derivate. Klin. Wchnschr., 13:321-323, 1934.
A very well written review article on the constitution of blood pigments and their derivatives.
A,c,d; F,a,b; I,1,2; (4).

106. Hausmann, W.
Über Strahlenhämolyse. Strahlentherapie, 9:46-80, 1919.
Detailed review article on hemolysis of erythrocytes by light and x-rays. Technique as well as results. A large number of references.
I,1,2,4,5; II,2; (4).

107. Hausmann, W.
Über den Hypericismus. Zugleich ein Beitrag zur Geschichte der Lichtpathologie. III. Strahlentherapie, 41:145-154, 1931.
Hypericism is the sensitivity of non-pigmented animals to light after feeding on hyperacea. The material "hypericin", isolated by H. Fischer behaves like the natural plant. Apparently the photodynamic action of the material is excited by visible light. Good review of early photodynamical work.
A,f; E,b; F,c; I,1,5; II,2; (2).

108. Hausmann, W. and Kuen, F.M.
Über photobiologische Sensibilisation und Desensibilisation im Ultraviolett. Klin. Wchnschr., 12:711-712, 1933.
Interesting article on the effect of light on blood agar in the presence of different sensibilizers.
See detailed article later.
F,b; I,4,5; II,2; (3).

109. Hausmann, W. and Loewy, A.
Die hämolysierende Wirkung der Sonnenstrahlen im Hochgebirge. Biochem. Ztschr., 173:1-6, 1926.
Even glass-filtered sunlight will have hemolysing effect.
I,4; (3).

110. Hausmann, W. and Löhner, L.
Über photobiologische Desensibilisation von Warmblütern im luftverdünnten Raume. Biochem. Ztschr., 173:7-13, 1926.
Mice treated with hematoporphyrin observed in air at atmospheric and at reduced pressure.
General physiological importance.
F,b; I,4; (6).

111. Hausmann, W. and Rosenfeld, P.
Zur Kenntnis des Hypericismus. Zugleich ein Beitrag zur photobiologischen Sensibilisation im Ultraviolett. III. Strahlentherapie, 45:125-132, 1932.
Hypericin shows strong absorption in the ultra-violet. Sensibilization of erythrocytes for hypericin investigated. (New literature is given.)
F,b; I,4,5; II,2; (6).

112. Hausmann, W. and Sonne, C.
Über die sensibilisierende Wirkung des Hämatoporphyrins im Ultraviolett. Strahlentherapie, 25:174-182, 1927.
Red blood corpuscles can be sensitized for the ultra-violet by hematoporphyrines. The sensibilisation is strongest at λ 3130 Å; and less at λ 2800 Å and 2650 A.
F,b; I,1,4,5; II,2; (2).

113. Heesch, O.
Herzfunktionsprüfungen vor Operationen. Zentralbl. f. Gynäk, 53:1866-1867, 1929.
Author recommends highly the use of Heilmeyer's method of estimation of blood pigment by use of Pulfrich's photometer. The method is more reliable than other ones for determination of the heart function.
Clinical importance.
F,a; I,1,2; (3).

114. Hegler, C.
Klinische Beobachtungen über Methämoglobinämie und Hämatinämie. München. med. Wchnschr., 59:2924-2925, 1912.
Clinical importance.
I,4; (6)

115. Heilmeyer, L.
Blutfarbstoffwechselstudien. I. Probleme, Methoden und Kritik der Whippleschen Theorie. Deutsches Arch. f. klin Med., 171:123-153, 1931.
Extensive paper containing a good review and bibliography on the production of blood pigments in the body.
F,b; I,2; VII; (4).

116. Heilmeyer, L.
Blutgarbstoffwechselstudien. III. Blutmauserung und Leberfunktion beim Morbus Basedow. Deutsches Arch. f. klin. Med., 171:515-528, 1931.
The changes in urobilinogen excretion in the above pathological cases studied.
Clinical importance.
F,b; I,2; VII; (3).

117. Heilmeyer, L.
Blutfarbstoffwechselstudien. IV. Die Blutfarbstoffwechselregulation bei der akuten und chronischen Blutungsanämie, sowie bei einigen sekundären Anämien anderer Genere. Deutsches Arch. f. klin. Med., 172:341-357, 1932.
Changes in hemoglobin and urobilin excretion in bleeding anemia.
A,d; F,b; I,1,2; (2).

118. Heilmeyer, L.
Blutfarbstoffwechselstudien. V. Der Farbstoffwechsel beim hämolytischen Ikterus und einigen hämolytischen Anämien verschiedener Genere. Wirkungen des Leberstoffs und peroraler Milzverabreichung. Deutsches Arch. f. klin. Med., 172:628-645, 1932.
Clinical importance.
A,e; F,b; VII; (6).

119. Heilmeyer, L.
Blutfarbstoffwechselstudien. VI. Die Regenerations- und Farbstoffwechselvorgänge beim Morbus Biermer sowie bei Botriocephalusanämie vor und nach der Leberbehandlung. Deutsches Arch. f. klin. Med., 173:128-163, 1932.
Clinical and laboratory observations in above diseases.
A,d; F,b; I,1,2; VII; (6).

120. Heilmeyer, L.
Die Refraktometrie. Handb. d. allgem. Hämatologie, Vol. II. 1. Hälfte, 407-434, 1933.
Up-to-date review of blood refractometry.
V,2; (4).

121. Heinemann, M.
Cytagenin und mitogenetische Strahlung des Blutes. Klin. Wchnschr., II: 1375-1378, 1932.
Used yeast detecting method. Ultra-violet radiation increases the mitogenetic radiation of the blood of healthy people. Non-radiating blood of carcinomatous and aged persons can be activated by ultra-violet radiation. Cytagenin is mitogenetically active and retains this property for many weeks. The non-radiating blood of cancerous patients can be activated by injections of cytagenin. Tonsilitis with general effects will stop mitogenetic radiation of the blood.
A,f; II,5; (2).

122. Heinemann, M. and Seyderhelm, R.
Weitere Untersuchungen über die mitogenetische Strahlung des Blutes unter besonderer der "Strahlungen" des Blutes von Carcinomkranken. Klin. Wchnschr., 1:990, 1933.
Authors able to get very much more uniform results with blood of carcinomatous persons if they used cells covered with quartz to hold the blood.
A,f; II,5; (3).

123. Henning, N. and Schaefer, W.
Untersuchungen über Photoaktivität. Biochem. Ztschr., 177:109-117, 1926.
Authors investigated a large number of materials for their photoactivity. Good illustrations. (See also several critical articles on this subject).
A,c; B; C; I,1,4,5; II,2,3; (6).

124. Herzfeld, E. and Klinger, R.
Zur Chemie des Blutfarbstoffes. Biochem. Ztschr., 100:64-80, 1919.
General chemistry of blood pigment. No absorption work.
F,b; VII; (6).

125. Herzog, A.
Über die eisenhaltige Komponente des Blutfarbstoffes und ihre Synthese mit Globin zu Hämoglobin. Biochem. Ztschr., 260:213-214, 1933.
Preliminary notice about the preparation of hemoglobin.
F,b; VII; (3).

126. Hetper, J. and Marchlewski, L.
Untersuchungen über den Blutfarbstoff. Ztschr. f. physiol. Chem., 41:38-41, 1904.
Chemical investigation of certain blood pigments.
F,b; I,1,2; (5).

127. Heubner W. and Rosenberg, H.
Photographische Bestimmung der Intensitätsverteilung in Blutspektren. Biochem. Ztschr., 38:345-384, 1912.
H,a; I,1,2; (6).

128. Higaki, R.
Über die biologische Wirkung der Höhensonnenstrahlen. I. Mitt. Okayama-Igakkai-Zasshi, 45:1038-1072, 1933.
Lime and calcium levels determined. German summary not clear.
I,4; VII; (6).

129. Hluckovsky, B.
Über die Wirkung der Quarzlampenbestrahlung der Versuchstiere auf die Autohämylose in vitro. Protoplasma, 18:126-129, 1933.
There is a certain lag from time animal is irradiated to time when action of light on the blood has become recognizable.
I,4; (3).

130. Hoess, H.
Plasmoveränderungen unter der Einwirkung des Ultraviolettlichtes. Strahlentherapie, 45:97-106, 1932.
Ultra-violet irradiation does not create structural changes in the plasma colloid of healthy persons.
A,f; I,4; (3).

131. Hoppe-Seyler, F.
Über die Einwirkung des Kohlenoxydgases auf das Hämatoglobin. Virchows Arch. f. path. Anat., 11:288-289, 1857.
F,b; I,1,2; (5).

132. Hoppe-Seyler, F.
Weitere Mitteilungen über die Eigenschaften des Blutfarbstoffes. Ztschr. f. physiol. Chem., 1:121-139, 1878.
F,b; I,1,2; (5).

133. Hoppe-Seyler, F.
Beiträge zur Kenntnis der Eigenschaften der Blutfarbstoffe. Ztschr. f. physiol. Chem., 13:477-496, 1889.
F,b; I,1,2; (5).

134. Hüfner, G.
Über die Quantität Sauerstoff, welche 1 Gramm Hämoglobin zu binden vermag. Ztschr. f. physiol. Chem., 1:317-329, 1878.
Early paper on the properties of hemoglobin.
F,b; I,1,2; (5).

135. Hüfner, G.
Über die Bestimmung des Hämoglobin- und Sauerstoffgehaltes im Blute. Ztschr. f. physiol. Chem., 3:1-18, 1879.
Early paper on blood pigments.
F,b; I,1,2; (5).

136. Hüfner, G.
Neue Versuche zur Bestimmung der Sauerstoffkapazität des Blutfarbstoffs. Arch. f. Anat. u. Physiol., 130-176, 1894.
F,b; H,a; I,1,2; (5).

137. Hüfner, G.
Nachträgliche Bemerkungen zu Dr. v. Zeyneks Versuchen, die die Bildung des Methämoglobins betreffen. Arch. f. Anat. u. Physiol., Physiol. Abt., 491-499, 1899.
F,b; I,1,2; (5).

138. Hüfner, G.
Über die gleichzeitige quantitative Bestimmung zweier Farbstoffe im Blute mit Hilfe des Spectrophotometers. Arch. f. Anat. u. Physiol., 39-48, 1900
H,a; I,1,2; (6).

139. Hüfner, G.
Neue Versuche über die Dissociation des Oxyhämoglobins. Arch. f. Anat. u. Physiol. Supple. Band, 187-217, 1901.
F,b; I,1,2; (5).

140. Hüfner, G.
Noch ein Mal die Frage nach der "Sauerstoffcapacität des Blutfarbstoffs." Arch. f. Anat. u. Physiol., 217-224, 1903.
F,b; I,1,2; (5).

141. Hüfner, G.
Über einige Fragen von prinzipieller Bedeutung für die Spektrophotometrie des Blutes. Ztschr. f. physiol. Chem., 58:39-49, 1909.
I,1,2; (5).

142. Hüfner, G. and Külz, R.
Über den Sauerstoffgehalt des Methämoglobin. Ztschr. f. physiol. Chem., 7:366-374, 1883.
Early observations on the oxygen content of methemoglobin.
I,1,2; (5).

143. Ito, T.
Über einige Anwendungen ultravioletter Strahlen zu gerichtlichmedizinischen Zwecken. Deutsche Ztschr. f. d. ges. gerichtl. Med., 9:726-727, 1927.
Fluorescence of bone, hair, milk, urine, finger prints, sperm, blood spots, and other material utilized for legal purposes.
A,c,d,e; II,2; (4).

144. Jäderholm, A.
Untersuchungen über den Blutfarbstoff und seine Derivate. Ztschr. f. Biol., 13:193-255, 1877.
I,1,2; F,b; (5).

145. Jäderholm, A.
Über Methämoglobin. Ztschr. f. Biol., 16:1-23, 1880.
Early review article.
F,b; I,1,2; (5).

146. Jäderholm, A.
Studien über Methämoglobin. Ztschr. f. Biol., 20:419-448, 1884.
I,1,2; (5).

147. Jaquet, A.
Beiträge zur Kenntnis des Blutfarbstoffes. Ztschr. f. physiol. Chem., 14:289-296, 1890.
Chemical investigation of blood pigments.
VII; (5).

148. Jendrassik, L. and Czike, A.
Bestimmung des Bilirubins im Blute. Ztschr. f. d. ges. exper. Med., 60:554-562, 1928.
Modification of Van den Bergh's method of bilirubin determination.
F,b; H,a; I,1,2; (6).

149. Joachimogen, G.
Zur Pharmakologie des Arsenwasserstoffs. Arch. f. exper. Path. u. Pharmakol., 85:52-60, 1920.
Observations of changes in absorption spectra of blood when treated with AsH_3. Good reproductions of absorption spectra with continuous source.
I,1,2; (3).

150. Jones, H.F. and Goslin, R.
Some quantitative studies of the localization of uranium in the principal organs of rabbits during the course of uranium intoxication by use of the magneto-optic method. Am. J. Physiol., 105:693-696, 1933.
Sensitivity of method is 0.663 X 10^{-12} grams U/cc. With this sensitivity, uranium in blood, urine, and various organs determined. No uranium found in gallbladder. Uranium excreted through kidney during first 24 hours.
A,c,d,f; II,1; V,1; (2).

151. Kämmerer, H.
Bakterien und Blutfarbstoff. Arch. f. exper. Path. u. Pharmakol., 88:247-286, 1920.
Effect of bacteria on blood pigments and of blood pigments on bacteria.
F,b; G,c; I,4,5; II,2; (3).

152. Kannegiesser, N.
Die mitogenetische Spektralanalyse. I. Introduktion by A. Gurwitsch. Biochem. Ztschr., 236:415-424, 1931.
Gurwitsch in introduction reports following two points: 1. All yeast buds are counted "blindly" and all slides marked by third person who is not acquainted with results. ". In spectral analysis values obtained are not only statistically correct but each single experiment points in correct direction. Glycolysis of blood and oxidation models investigated. Glycolytic spectrum has bands at λ 1900-2000 Å and λ 2120 to 2200 Å. Oxidative spectrum is from λ 2230 to λ 2340 Å.
F,c; II,5; (2).

153. Karpas, A.M. and Lanschina, M.N.
Über den Verlust des mitogenetischen Strahlungsvermögens des Blutes. a. bei längeren Stehen in vitro. b. nach Bestrahlung mit ultraviolettem Licht. Biochem. Ztschr., 253-313-317, 1932.
Excess of glucose in blood will stop mitogenetic radiation. Apparently blood radiation is purely glycolytic radiation. Glucose in blood is destroyed by radiation of λ 2300 to λ 2500 Å. (See Gesenius).
II,5; (3).

154. Kennedy, R.P.
A spectrophotometric study of blood solutions. Am. J. Physiol., 79:346-361, 1926.
Analysis of hemoglobin solutions carried out by oxygen capacity method and results correlated with the quantitative measurements of light absorption by such solutions. Value for the absorption ratio agrees with those of some other investigators obtained for crystallized oxyhemoglobin. Large part of article devoted to technique.
F,b; H,a; I,1,2; (2).

155. Kennedy, R.P. and Whipple, G .H.
The identity of muscle hemoglobin and blood hemoglobin. J. Physiol., 76:685-692, 1926.
Solutions of muscle hemoglobin free from blood hemoglobin give curves very similar to curves obtained from blood hemoglobin.
A,f; F,b; I,1,2; (3).

156. Kesten, H.D. and Zucker, T.F.
Light transmission through blood suspensions as recorded by the photoelectric cell. Proc. Soc. Exper. Biol. & Med., 24:19-20, 1926.
I,1,2; (6).

157. Klenitzky, J.
Die mitogenetische Strahlung der weissen Blutelemente. Biochem. Ztschr., 252:126-130, 1932.
White blood elements give up mitogenetic radiation. Spectral analysis shows bands for glycolysis, oxydation, phosphatase effect, and proteolytic effects. Source of the radiation is intercellular.
II,5; (3).

158. Koeppe, H.
Wirkungsweise der ultravioletten Strahlen auf die roten Blutkörperchen. Strahlentherapie, 23:671-680, 1926.
H,c; I,1,2,4; (3).

159. Kollath, W.
Ultraspektrometrie des Blutes, eine Methode für die Vitaminforschung. Strahlentherapie, 28:115-119, 1928.
Kollath urges use of ultra-violet absorption of blood as indication of presence of vitamin D precurser.
C; I,1,2,4; (6).

160. Kollath, W., Leichtentritt, B., and Suhrmann, R.
Die quantitative spektroskopische Untersuchung des Blutes. Monatschr. f. Kinderh., 38:5-9, 1928.
Report of a lecture. See other papers for details.
I,1,2; (4).

161. Kollath, W. and Suhrmann, R.
Über die Absorption des ultravioletten Lichtes durch Blut Serum und Lipoide. Ztschr. f. wissensch. Bäderkd., I:781-784, 1928.
Review of Kollath's and Suhrmann's work on absorption of blood serum and lipoids.
A,c; F,a; I,1,2; (4).

162. Kostyál, L.
Über die Wirkung der Quarzlampenbelichtung auf die Eiweissfraktion des Blutplasmas in vitro. Biochem. Ztschr., 229:100-108, 1930.
Protein colloids of blood have different sensitivity to ultra-violet for different diseases. Author discusses theory of denaturing of proteins in detail and speculates on the nature of effect of ultra-violet.
A,c; F,a; I,4; (3).

163. Krosten, H.D. and Zucker, T.F.
The determination of rate of hemolysis by the measurement of light transmission. Am. J. Physiol., 87:263-273, 1928.
Method for determination of rate of hemolysis, using photoelectric cell to follow changes in light transmission through the hemolyzing suspension from moment to moment.
I,1; (3).

164. Kroetz, C.
Zur Biochemie der Strahlenwirkungen. I. Der Einfluss ultravioletter und Röntgenstrahlen auf die aktuelle Blutreaktion und auf die Erregbarkeit des Atemzentrums. Biochem. Ztschr., 151:146-166, 1924.
Observation on effect of ultra-violet and x-ray radiation on patient.
A,f; I,4; VI,2; (6).

165. Kühl, G.
Experimentelle Untersuchungen über Blutumsatz und Urobilinausscheidung. Arch. f. exper. Path. u. Pharmakol., 103:247-259, 1924.
A,d; F,b; I,1,2; (6).

166. Küster, W.
Beiträge zur Kenntnis des Blutfarbstoffes. Ztschr. f. physiol. Chem., 66:165-249, 1910.
F,b; I,1,2; (5).

167. Küster, W.
Die eisenhaltige Komponente des Blutfarbstoffes, ihr Nachweis und ihre Derivate. Abderhalden's Handb. d. bio. Arbeitsmeth. Abt. I. Teil 8, 201-222, 1922.
Spectrographic determination of iron-containing component of blood pigment.
F,b; I,1,2; (4).

168. Küster, W.
Über individuelle Blutuntersuchungen. III. Ztschr. f. physiol. Chem., 138:21-37, 1924.
Chemico-physiological paper.
F,b; I,1; VII; (3).

169. Küster, W.
Über den Blutfarbstoff und einige komplexe Ferrosalze. Chem. d. Zelle u. Gew., 12:1-21, 1925.
F,b; I,1,2; (3).

170. Küster, W.
Über den Blutfarbstoff. Chem. d. Zelle u. Gew., 13:50-79, 1926.
Chemistry of blood pigment.
F,b; I,1,2; (4).

171. Küster, W. and Oesterlin, H.
Individuelle Blutuntersuchungen. 2. Mitt. Ztschr. f. physiol. Chem., 136:279-292, 1924.
Chemical investigation.
VII; (6).

172. Latmanisova, L. Markova, L., and Ufland, J.
Die mitogenetische Strahlung des Blutes und ihre Veränderungen bei der Arbeit. Fiziol. Z. 16:505-511, 1933.
Intense work will stop mitogenetic radiation of the blood.
II,5; (3).

173. Leers, O.
Die forensische Blutuntersuchung. Pp.212. Berlin: J. Springer, 1910.
Description of blood tests for forensic purposes. Good literature list on absorption of different types of blood pigments.
F,b; I,1,2; (3).

174. Lepeschkin, W.W.
The changes of the permeability of erythrocytes produced by light. Protoplasma, 18:243-259, 1933.
Permeability of erythrocytes for water soluble substances is increased by light.
I,4; (3).

175. Lepeschkin, W.W. and Davis, G.E.
Hemolysis and the solar spectrum. Protoplasma, 20:189-194, 1933.
Spectral distribution of efficiency of radiation in decreasing stability of red blood corpuscles corresponds very closely to spectral distribution of power of oxyhemoglobin to absorb radiation. This correspondence clearly indicates a chemical change in hemoglobin is responsible for decrease of resistance of corpuscles and hemolysis produced by light. In other words, hemolysis is not due, the authors believe, to some change in the membrane of the corpuscle, which is colorless, but to a chemical change in the hemoglobin; that is, in one of the components of the principal compounds constituting protoplasma of erythrocytes.
F,b; I,1,2,4; (2).

176. Letsche, E.
Zur Spektrophotometrie des Blutes. Ztschr. f. physiol. Chem., 63:313-314, 1909.
Discussion of Hüfner's method of spectroanalysis.
H,a; I,1,2; (5).

177. Letsche, E.
Über das Verhalten von Hämoglobin gegen Hydrazin und die Frage nach dem Gasbindungsvermögen des Blutfarbstoffs. Ztschr. f. physiol. Chem., 67:177-191, 1910.
F,b; I,1,2; (3).

178. Letsche, E.
Beiträge zur Kenntnis des Blutfarbstoffs. Ztschr. f. physiol. Chem., 76:243-257, 1912.
Discussion of extinction-coefficients of blood pigments.
F,b; I,1,2; (3).

179. Letsche, E.
Über die Einwirkung von Hydroxylamin auf den Blutfarbstoff. (Ein Beitrag zur Kenntnis des Methämoglobins). Ztschr. f. physiol. Chem. 80:412-429, 1912.
F,b; I,1,2; (3).

180. Lewin, L. Miethl, A., and Stenger, E.
Über die durch Photographie nachweisbaren spektralen Eigenschaften der Blutfarbstoffe. Pflüger's Arch. f. d. ges. Physiol., 118:80-128, 1907.
Absorption spectra discussed under following headings: (1) blood pigments and their decomposition products, (2) work on properties and origin of violet band in spectrum of blood pigments.
A,c; F,a,b; I,1,2; (5).

181. Lockemann, G.
Über Katalasen und Oxydasen im Blute. München. med. Wchnschr., 43:2162, 1907.
Blood Catalase effect retarded by visible light, more by blue than by red. Oxydase effect stimulated by visible light. (Short abstract of a paper).
B; I,4; (6).

182. Lockemann, G., Thies, and Wichern
Beiträge zur Kenntnis der Katalase des Blutes. Ztschr. f. d. ges. physiol. Chem., 58:390-431, 1909.
Light reduced action of catalase of blood.
B; I,4; (5).

183. Löhner, L.
Über die Beeinflussung der Strahlen und Wasserhämolyse durch Arsen. Biochem. Ztschr., 186:194-202, 1927.
Ultra-violet of sunlight sufficient to hemolyse blood. Arsenic compounds will sensitize for hemolysis. Arsenic will increase resistance against water hemolysis. Of medical importance.
F,b; I,4,5; II,2; (3)

184. Malczynski, S.
Variations de la composition minérale du sang sous l'influence de l'irradiation par les rayons solaires. Compt. rend. Soc. de. biol., 113: 1297-1300 (1933).
Dogs were exposed to sunlight during end of July 9 times (noon). Before, during and after exposure P, K, Ca and Na were determined. P and Na changes very little during exposure. K and Ca changes most. Ca increased.
I,4; (6).

185. Mann, C., Sheard, C., Bollman, J.L., and Baldes, J.
The site of the formation of bilirubin. Am. J. Physiol., 74:497-510, 1925.
Spectrometer used to determine bilirubin content of blood coming from arteries and veins of body parts. In most of the vascular areas, bilirubin content of specimens of blood from the two systems was the same, but bilirubin content of venous blood was greater than that of arterial blood of spleen and bone marrow. (Paper gives good comparison of different spectrographic methods).
A,d,e; F,b; H,a; I,1,2; (2).

186. Marchlewski, L.
Ein weiterer Beweis der chemischen Verwandtschaft des Chlorophylls und Blutfarbstoffs. Biochem. Ztschr., 3:320-322, 1907.
Relation between blood pigment and chlorophyll.
E,a; I,2; (5).

187. Marchlewski, L.
Bemerkung zu der Abhandlung von Grabowski und mir: Zur Kenntnis des Blutfarbstoffs. Ztschr. f. physiol. Chem., 82:413-414, 1912.
F,b; I,1,2; (3).

188. Marchlewski, L.
Chlorophyll et pigment du sang. Bull. Soc. chim. biol., 4:476-506, 1922.
Chlorophyll and blood-pigments compared. See later papers for up-to-date material.
E,a; I,1,2; (3).

189. Marconi, E.
Ricerche sulle radiazioni mitogenetiche del sangue umano col micrococcus prodigiosus come detectore. Pathologica, 23:684-688, 1931.
See abstract of article in Atti soc. ital. ostetr.
II,5; (6).

190. Marconi, E.
Radiazioni mitogenetiche del sangue retroplacentare e del sangue periferico della madre e del neonato II. Pathologica, 23:758-759, 1931.
With the help of the mitogenetic radiation effect, it is possible to differentiate between blood of mother and newborn child.
II,5; (6).

191. Marconi, E.
Il potere radiante del sangue periferico del neonato nella prima settimana di vita. Riv. ital. di ginec., 14:368-374, 1932.
Further work on blood radiation of newborn children (first week). Uses uviol glass in place of quartz.
II,5; (6).

192. Marconi, E.
Ricerche sulle radiazioni mitogenetiche. Potere radiante del sangue retroplacentare e del sangue periferico materno e fetale. Atti Soc. ital. Ostetr., 30:503-506, 1932.
Author detected mitogenetic radiation with liquid suspensions of B. prodigiosus. Worked with 0.05 ccm. Retroplacental blood gave highest mitogenetic effect, next blood of mother, and finally fetal blood.
II,5; (3).

193. Martenstein, H.
Experimentelle Beiträge zur biologischen Wirkung der ultravioletten Strahlen. Strahlentherapie, 18:283-319, 1924.
Effect of ultra-violet on blood in vivo and in vitro is investigated Good bibliography.
H,c; I,1,2,4,5; (3).

194. Martini, P., Loewe, G., Jonkow, Schuler, B., and Stützel, O.
Spektralphotometrische Blutuntersuchungen. Deutsches Arch. f. klin. Med., 170:72-90, 1931.
Used Martens and Grünbaum's spectrophotometer. Hüfner's quotient $\frac{\lambda\ 5385\ \text{Å}}{\lambda\ 5600\ \text{Å}}$ in general quite constant. However, quotient will vary from 1.720 to 1.610. The average quotient in the following diseases was determined. Cancer: Normal = 1.654, Portio = 1.656, Large intestine = 1.634, Stomach = 1,630. Infectious Diseases: Typhoid = 1.632, Sepsis = 1.630, Erysipelas = 1.620, Pulmonary Tuberculosis = 1.610, Scarlet fever = 1.603. Blood diseases: Lymphogranuloma = 1.623, Pernicious anemia = 1.596, Myeloid leukemia = 1.596, Icterus = 1.584.
F,b; I,1,2; (4).

195. Martini, P. and Schuler, B.
Spektralphotometrische Blutuntersuchungen. Ztschr. f. d. ges. exper. Med., 83:211-220, 1932.
Oxyhemoglobin changes under the influence of ultra-violet. Authors doubt the statements of Gibbs, Johnson and Shapiro that blood does not change in light.
The quotient $\frac{E\ \lambda\ 4138\ \text{Å}}{E\ \lambda\ 4000\ \text{Å}}$ indicates whether oxyhemoglobin has been changed. If this quotient is constant, there is no change. The change of oxyhemoglobin is independent of the presence of distilled H_2O, 0.1 NaOH solution, borax solution, or phosphate buffer pH 7.35. Absorption maxima are for oxyhemoglobin at λ 4138 Å, CO-hemoglobin λ 4160 Å, CN-hemoglobin λ 4180 Å, Meth-neutral hemoglobin λ 4000 Å, Meth-Alkhemoglobin λ 3900 Å.
F,b; I,1,2; (2).

196. Masing, E.
Über das Hämoglobin in normalen und pathologischen Zuständen. I. Teil. Lichtextinktion und Eisengehalt. Deutsches Arch. f. klin. Med., 98:122-136, 1910.
Blood in health and disease shows same type of extinction coefficient; same percentage of iron per gram.
I,2; (3).

197. Meyer, E. and Reinhold, A.
Untersuchungen über die Gewebsatmung am Lebenden. Klin. Wchnschr., 5:1692-1696, 1926.
By observing absorption of light by blood circulating in skin between fingers, authors were able to follow oxygen content of blood. Tissue respirations observed under influence of several stimulants.
I,4; (3).

198. Meyerstein, W.
Über Einwirkungen des Lichtes auf das Blut. Klin. Wchnschr., 7:2244-2245, 1928.
Author exposed blood in thin glass vessels to sunlight.
I,4; (6).

199. Meyerstein, W.
Über die Lichtempfindlichkeit der roten Blutkörperchen. Wien Arch.f. inn. Med., 18:359-364, 1929.
Effect of light on red blood corpuscles.
I,4; (3).

200. Moschini, S.
Rapporto fra potere radiante e riserva alcalina del sangre in talune malattie dei bambini. Radiobiologia, 1:9-18, 1933.
Investigation of radiation power of blood of children in different pathological conditions.
II,5; (3).

201. Müller, F.
Die Blutkörperchenzählung und Bestimmung des Blutfarbstoffes. Abderhalden's Handb. d. biol. Arbeitsmeth., Abt. IV., Teil 3, 1. Hälfte, 19-62, 1924.
Clinical importance.
F,b; I,1,2; (6).

202. Münch, M.
Der Blutfarbstoff. Melliands Textilber., 13:205-206, 1932.
Well written short review of work of H. Fischer on blood pigments. Average weight 120 Kg. and 3 L. of blood per person corresponds to 15 g of hemin. Total earth population of 1500 millions means 22 millions kg. of hemin. Every person regenerates his blood in 70 days indicates yearly production of 110 millions Kg. of hemin. If we include animals the figures would be much larger.
B; F,b; I,1,2; (4).

203. Naumann, H.N.
Über die Beeinflussung von Drehung und Mutarotation der Glucose. II. Der Einfluss einiger Salze und organischer Körper. Biochem. Ztschr., 242:259-265, 1931.
Sodium sulphate and magnesium sulphate, left over from the purification of protein solutions never have a pronounced influence on optical rotation of glucose, nor do substances usually present in body fluids. Alcohol and acetic acid do have a pronounced influence on optical rotation.
A,c,d,e; I,1,2; IV,1; (3).

204. Naumann, H.N.
Die optische Aktivität des Blutfiltrats. I. Über die Methodik der Herstellung und Untersuchung von Blutfiltraten. Biochem. Ztschr., 251:266-274, 1932.
For the purification of blood filtrate neither dialysis nor ultrafiltration can be used. Only methods removing proteins by precipitation of any use. High degree of optical exactness of degree of polarization can be obtained with methods described by author.
IV,1; (3).

205. Naumann, H.N.
Die optische Aktivität des Blutfiltrats. II. Über den Eingluss der Azidität und die Beziehung von Drehungs- und Reduktionswert. Biochem. Ztschr. 257:32-40, 1933.
Blood filtrate purified after Folin-Wu dependent in its optical rotation on the acidity and has maximum of right rotation at pH-0.7. The rotation under acid conditions not caused by glucose alone, but by an equilibrium of all constituents of blood filtrate. Folin-Wu and zinc filtrates of normal and diabetic persons show considerable difference in optical rotation when uremia with high red-N is active.
A,c; IV,1; (2).

206. Nencki, M. and Zaleski, J.
Untersuchung über den Blutfarbstoff. Ztschr. f. physiol. Chem., 30:384-435, 1900.
F,b; I,1,2; (5).

207. Nicolai, L.
Fortgesetzte Untersuchungen über den Verlauf der Oxyhämoglobinreduktion in der menschlichen Haut. Pflügers Arch. f. d. ges. Physiol., 230-238-245, 1932.
F,b; I,1,2; (3).

208. Nicolai, L.
Über Sichtbarmachung, Verlauf und chemische Kinetik der Oxyhäminoglobinreduktion im lebenden Gewebe, besonders in der menschlichen Haut. Pflügers Arch. f. d. ges. Physiol., 229:372-384, 1932.
Author was able to demonstrate reduction of O_2 - Hemoglobin in living human skin. It is thought that this process is a monomolecular reaction. Interesting experimental set-up.
H,a; I,1,2; (2).

209. Nicloux, M.
L'oxyde de carbone et l'intoxication oxycarbonique. Pp. 254. Paris: Masson, 1925.
Contains a chapter on the spectrophotometry of blood.
F,b; I,1,2; (4).

210. Nicloux, M. and Fontés, G.
Sur quelques modes de formation de la méthémoglobine et sur son dosage. Bull. Soc. Chim. biol., 6:733-741, 1924.
Preparation of methemoglobin.
F,b; I,1,2; (6).

211. Nicloux, M. and Roche, J.
Sur la teneur en oxygène de la méthémoglobine. Bull. Soc. Chim. biol., 8:71-97, 1926.
Oxygen content of different hemoglobins.
I,1,2; (4).

212. v. Noorden, C.
Beiträge zur quantitativen Spectralanalyse, insbesondere derjenigen des Blutes. Ztschr. f. physiol. Chem., 4:9-35, 1880.
H,a; I,1,2; (5).

213. Nothaas, R.
Die Ableitung von Harnfarbstoff aus dem Hämoglobin. Zur Frage des physiologischen Blutfarbstoffabbaues. III. Klin. Wchnschr., 12:1438-1441, 1933.
Author believes that blood pigment obtained by him and Urochrom B of Heilmeyer are very similar if not identical.
A,d; F,b; I,1,2; (2).

214. Odin, M. and Werdinius, E.
The personal equation in the colorimetric determination of the haemoglobin. Acta Med. Scandinav., 81:239-248, 1934.
"Personal" factor in hemoglobin determination discussed.
H,a; I,1; (6).

215. Oppler, B.
Zur Methodik der quantitativen Traubenzuckerbestimmung des Blutes. Ztschr. f. physiol. Chem., 64:393-422, 1910.
F,c; H,a; IV,1; (6).

216. Paul, R.
A comparative study of the rotatory and reducing properties of ultra-filtrates from blood plasma. J. Clin. Investigation, 3:631-652, 1927.
Presence of levorotatory substances in normal blood confirmed. Suggested that in these changes optically active substances other than glucose largely responsible for fluctuations of rotatory values observed in ultrafiltrates from plasma.
A,c; IV,1; (3).

217. Paul, R.
A comparative study of the rotatory and reducing properties of plasma ultra-filtrates from diabetic and nephritic patients. J. Clin. Investigation, 5:303-316, 1928.
Clinical importance.
IV,1; (6)

218. Pfeiffer, H.
Über die Wirkung des Lichtes auf Eosin-Blutgemische. Wien. klin. Wchnschr., 18:221-222, 1905.
Effect of visible light on eosin-blood-mixture.
I,4,5; II,2; (6).

219. Pincussen, L.
Über Veränderungen des Stoffwechsels unter Bestrahlung VIII. Über die Beeinflussung den Blutzucker verändernder Faktoren in den Organen durch Strahlung und Insulin. Biochem. Ztschr., 239:290-302, 1931.
Radiation will realse materials in the body which have similar effects to insulin. General physiological paper.
D; I,4; (6).

220. Pincussen, L. and Yokota, S.
Über Veränderung des Stoffwechsels unter Bestrahlung. IX. Zur Veränderung der reduzierenden Substanzen im Blute durch Strahlung. Biochem. Ztschr., 241:398-402, 1931.
Clinical importance.
I,4; (6).

221. Plesch, J.
Hämodynamische Studien. Ztschr. f. exper. Path. u. Therap., 6:380-618, 1909.
Description of chromophotometer and determination of blood pigments.
H,a; I,1,2; (5).

222. Potozky, A. and Zoglina, I.
Untersuchungen über mitogenetische Strahlung des Blutes. Biochem. Ztschr. 211:352-361, 1929.
Mitogenetic radiation of vertebrate blood of two kinds, glycolysis and oxydation of polypeptides. Disappearance of mitogenetic radiation of starving animals caused by disappearance of above two reactions.
F,c; II,5; (3).

223. Pozzan, A.
Emocateresi e raggi mitogenetici. Radiobiologia, 1:68-71, 1932.
Blood reduction and mitogenetic radiation (see Protti).
II,5; (6).

224. Protti, G.
Di un apparecchio per la determinazione biologica della azione irradiante germinatrice dell sangue (azione mitogenetico di Gurwitsch). Communicazione alla XIX riun. della soc. Venezia - Tridentina, 1930.
II,5; (6).

225. Protti, G.
Involuzione senile, omogenesi e radiazioni ematiche. Communicazione alla XIX riun. della soc. Venezia-Tridentina, 1930.
II,5; (6).

226. Protti, G.
L'emoinnesto intramuscolare e la radiazioni vitali nella recchiaia e nell'esaurimento. Pp. 140 Milano: Ulrico Hoepli, 1931. (The intramuscular injection of blood and the vital radiations in senility and exhaustion.)
Treated patients affected with precocious senility by intramuscular injections of small amounts of blood of identical blood grouping (10-20 cc) extracted from young and healthy persons. In general 5 injections given in 15 days, first two at 2 day intervals. Blood pressure and pulse became normal, an increase in red cell count, of hemoglobin, diminution of blood viscosity and marked general improvement. Effects attributed to action of mitogenetic rays. In blood mitogenetic rays are derived from oxidative

and glycolytic enzymes: they are absent in blood serum and in patients with cancer. By means of his "emoradimetro" a modification of Gurwitsch's "Kapillar Kammer" author determines radiating power of blood when acting upon yeast cultures. Reports having obtained photograph of blood radiations by exposing blood to especially sensitized photographic plate, during 70 to 120 hours. (Baron in Biol. Abstr.)
H,a; II,5; (6).

227. Ray, G.B. and Paff, G.H.
A spectrophotometric study of muscle hemoglobin. Am. J. Physiol. 94: 521-528, 1930.
Muscle hemoglobin is distinct from blood hemoglobin in that the absorption curves of reduced and oxyhemoglobin both show a characteristic shift towards the red end of the spectrum. This seems not to be due to fermentation since it is found to occur in situ in fresh muscle. The shift in the position of the alpha band occurring as a result of CO-hemoglobin formation is not the shift one would expect if the pigment were identical with blood hemoglobin.
F,b; I,1,2; (2).

228. Reche, O.
Fluoreszenzdiagnostik. München, med. Wchnschr. 78:2051, 1931.
Polemic against Kämmerer, München on fluorescence of blood pigments.
F,b; II,2; (6).

229. Redfield, A.C.
The absorption spectra of some bloods and solutions containing hemocyanin. Biol. Bull., 58:150-175, 1930.
Absorption spectra of blood constituents of certain invertebrates.
I,1,2; (3).

230. Reed, C.I. and Barnard, R.D.
Studies on the physiological action of light. VIII. An attempt to characterise the substance giving increased uric acid values after irradiation of blood. Am. J. Physio. 93:146-151, 1930.
I,1,2,4; (6).

231. Reid, A.
Das sauerstoffübertragende Ferment der Atmung. Ergebn. d. Enzymforsch. I:325-344, 1932.
Good review of work on oxygen transmitting enzyme of respiration. Large number of references. Material discussed under Absorption spectrum of CO-compound of oxygen transmitting enzyme; chemical structure of enzyme talmin; modellcatalyser with hemines; oxygenfree respiration; MacMunn's histohemines; effect of H C N on respiration; activation of combustible materials; importance of surfaces for respiration.
B; F,a,b; I,1,2,4,5; II,2; (1) (4).

232. Reiss, E.
Refraktometrische Blutuntersuchungen. Abderhalden's Handb. d. biol. Arbeitsmeth., Abt. IV. Teil 3, 1. Hälfte, 299-334, 1924.
Application of refractometry to blood investigations.
V,2; (4).

233. Risler, J., and Courmelles, F. de
Spectres d'absorption infrarouges du sang et de la gélatine. Rev. de path. comparée, 27:957-959, 1927.
Blood and gelatine have broad absorption band between λ 5.5 and 11μ.
F,a; I,1,2; (3).

234. Roffo, A.H.
Les rayons ultraviolets et l'hémolyse des hématies normales et néophasiques proorquée par l'erythrosine. Neoplasmes 2:351-365, 1932.
I,4,5; II,2; (3).

235. Roffo, A.H.
Die ultraviolette Bestrahlung und Erythrocytenhämolyse von normales Blutbildern und von Krebskranken. (Portuguese). Rev. radiol. clin. 2:461-471, 1932.
Irradiation of red blood corpuscles in vitro produces mild hemolysis. Effect of photodynamic substances, light and other factors in hemolysis (Ztschr. d. Radiol.).
A,f; I,4,5; II,2; (3).

236. Roffo, A.H.
Ultraviolet rays and erythrohemolysins of normal and cancerous blood cells. Bol. Inst. de Med. exper. para el estud y trat. del cancer, 9:5-26, 1932.
Irradiation of red blood cells in vitro with ultra-violet produces weak acceleration of hemolysis. This acceleration occurs quicker in red blood cells of rats with tumors.
A,f; I,4; (3).

237. Roffo, A.H. and Calcagno, O.
Les dérivés de la fluoresceine et leur action sur les hématies du sang normal et du sang cancéreux. Néoplasmes 2:321-341, 1933.
Effects of large number of fluorescine derivatives on healthyand cancerous blood.
A,f; I,4,5; II,2; (3).

238. Rost, F. and Heise,
Beiträge zur Photographie der Blutspektra. Arbeiten aus dem kaiserl. Gesundheitsamt. 32:223-304, 1909.
Interesting review of technique and results of absorption spectrophotometry of blood pigments.
F,b; I,1,2; (4), (5).

239. Samarajew, W.N.
Die mitogenetische Strahlung des Blutes bei künstlicher Hyperthyreose und bei Basedowscher Krankheit. Endokrinologie, II:335-343, 1932.
Male human cases of Basedow's disease and doves fed with thyroidin show increase of blood radiation.
II,5; (3).

240. Schmidt, L.A. and Norman, G.F.
On the protection afforded to red cells against hemolysis by eosin. J. Infect. Dis., 27:40-45, 1920.
F,b; I,4,5; II,2; (6).

241. Schubert, E.V.
Das Blut als Angriffsfläche der ultravioletten Strahlen. Deutsche med. Wchnschr., 52:903-906, 1926.
General introductory remarks on use of monochromatic light in biology. Author studied reflected light.
A,f; I,1,4; (6).

242. Schumm, O.
Die Untersuchung der Faeces auf Blut. Pp. 38., Gustav Fischer. Jena, 1906.
Discussion of spectoscopic detection of blood in feces.
A,e; I,1,2; (6).

243. Schumm, O.
Über den Nachweis von Blutfarbstoff durch seinen an der Grenze des sichtbaren Violett liegenden Absorptionsstreifen. Ztschr. f. physiol. Chem., 63:479-483, 1909.
Certain modifications of spectrograph which will give clearer spectral lines in short visible part of spectrum.
H,a; I,1,2; (6).

244. Schumm, O.
Hämatinämie bei toxischem Blutkörperchenzerfall. Ztschr. f. physiol. Chem., 80:1-5, 1912.
A,c; I,1,2; (5).

245. Schumm, O.
Über das Vorkommen von Hämatin im Serum bei toxischem Blutkörperzerfall. Biol. Abt. d. ärztl. Ver. Hamburg. München. med. Wchnschr., 53:2923, 1912.
Short abstract of lecture. See complete paper.
F,b; I,1,2; (6).

246. Schumm, O.
Über den Nachweis der natürlichen Porphyrine in seriösen Flüssigkeiten und Organen. IV. Über Untersuchungen bei Hämatoporphyria congenita. Ztschr. f. physiol. Chem., 132:62-71, 1924.
Investigation of porphyrine in certain blood diseases.
F,b; I,1,2; (6).

247. Schumm, O.
Die spektroskopische und spektrographische Untersuchung des Blutes. Handb. d. allgem. Hämat. Vol. II. 1. Hälfte 585-618, 1933.
Good up-to-date review of apparatus and methods. Large literature list.
A,c,d,e; F,b; H,a; I,1,2; (4).

248. Seyderhelm, R.
Über einen durch ultraviolette Bestrahlung aktivierbaren, antianämisch wirkenden Stoff im Blute. Klin. Wchnschr. 11:628-631, 1932.
Clinical importance. There is present in blood partly in activated and partly in inactivated form, a substance, effect of which is anti-anemic. Substance can be activated by ulra-violet.
B; D; I,4; (2).

249. Sheard, C., Baldes, E.J., Mann, F.C. Bollman, J.L.
Spectrophotometric Determinations of Bilirubin. Am. J. Physiol., 76:577-585, 1926.
Effects of fading, slight degrees of turbidity, and hemolysis on spectrophotometric determinations of bilirubin in blood. Lambert's and Beer's laws obeyed at λ 4300-5000 Å. Possible to determine with spectrocopic method one-fiftieth of bilirubin, determined by van Bergh's method.
I,1,2; III,1; (2).

250. Siebert, W.
Die "mitogenetische" Strahlung des Blutes. in Handbuch der allgemeinen Hämatologie, Vol. II, 2nd half. 1339-1356, 1934.
Good review of detection and origin of mitogenetic blood radiation. Entirely from positive point of view.
II,5; (4).

251. Simmers, M.H.
An investigation of the physical structure of fibrin by x-ray crystal methods. Am. J. Physiol., 94:497-500, 1930.
Fibrin of a normal blood clot gives no diffraction pattern but fibrin formed by adding calcium chloride to oxalated plasma gives one. Fibrin prepared by adding calcium chloride to citrated plasma gives no diffraction pattern. Authors believe fibrin is not a crystalline substance.
A,c; VI,1; (2).

252. Snapper, J.
Über die Notwendigkeit, die spektroskopische Methode für den Nachweis von Blut in den Faezes zu benutzen (Enterogene Entstehung von Porphyrin aus Blutfarbstoff) Arch. f. Verdauungskr. 25:230*240, 1919.
A,e; I,1,2; (3)

253. Sorin, A.N.
Zur Analyse der mitogenetischen Induktion des Blutes. Arch. f. Entwicklngsmechn. d. Organ., 108:634-645, 1926.
Blood in presence of air gives up mitogenetic radiation in oxydation process. Hemolyzed blood keeps ability to radiate.
II,5; (3).

254. Sorin, A.N. and Kisliak-Statkewitsch, M.
Uber mitogenetische Induktion in den frühen Entwicklungsstadien des Hühnerembryo. Arch. f. Entwcklngsmechn. d. Organ., 113:724-730, 1928.
In first 4-5 days of development of chicken embryo mitogenetic radiation is concentrated in yolk. As soon as blood circulation starts in embryo, radiation is taken over by blood.
II,5; (3).

255. Suhrmann, R.
Quantitative Untersuchungen im Absorptionsspektrum des Blutes und seiner Bestandteile. Physik. Ztschr., 30:959-965, 1929.
Work of Suhrmann's laboratory on absorption spectra, in visible and ultra-violet, of blood, serum, plasma, reviewed from physical point of view.
A,c,e; F,b; I,1,2; (4).

256. Suhrmann, R. and Breyer, F.
Quantitative Untersuchungen in ultraroten Absorptionsspektrum der Blutkörperchen und des Plasmas. Strahlentherapie, 40:772-776, 1931.
Absorption spectra of blood corpuscles and plasma up to λ 2.8μ. Absorption above λ 1.μ similar to that of water.
A,c; F,b; I,1,2; (2).

257. Suhrmann, R. and Kollath, W.
Quantitative Messungen im sichtbaren und ultravioletten Absorptionsspektrum des Blutes und seiner Bestandteile. Biochem. Ztschr., 184:216-230, 1927.
A detailed description of the experimental set-up is given. The point-mercury vapor lamp of Heraeus used. The light was measured with a photoelectric cell only at the mercury line wave-lengths. At first blood diluted with distilled H_2O was used. Later the blood was diluted with citrate solution. Red blood corpuscles and plasma were investigated separately. The material was always investigated as fast as possible; shaken well.
Beer's law is obeyed for dilutions of 0.5 - 1%. The absorption band for the total blood at about λ5750, 5420, 4080, 3380, 2800, 2700 Å. Beginning with λ 2480 Å the curve rises rapidly. Total blood and blood corpuscles have all about the same absorption spectra. The plasma has a relatively very small absorption, only beginning with λ 3000 Å and helps to create the maximum at 2800 Å. Beginning with λ 2450 Å the plasma absorption increases rapidly.
A,c; I,1,2; (2).

258. Suhrmann, R. and Kollath, W.
Über die quantitative Absorption des ultravioletten Lichtes durch Blut, Plasma, und Lipoide. Med. Klin. 23:872-873, 1927.
Review article divided into two parts: I. Quantitative Messungen im Absorptionsspektrum des Blutes, der Blutkörper und des Plasmas. II. Über die physiologische und biologische Bedeutung der quantitativen Absorption der ultra-violetten und sichtbaren Strahlen durch Blut, Plasma, and Lipoide.
A,c; F,a,b; I,1,2; (4).

259. Suhrmann, R. and Kollath, W.
Quantitative Messungen im sichtbaren und ultravioletten Absorptionsspektrum des Blutes und seiner Bestandteile. III. Vergleichende Messungen am Plasma verschiedener Tiere. Strahlentherapie, 30:145-156, 1928.
Absorption measurements on plasma and blood corpuscles of rat, also serum of dove, and blood corpuscles of guinea-pig.
Spectra of rat and dove serum differ very much, caused not by concentration but by different composition.
The blood corpuscles absorption curves of rat, guinea-pig, and man coincide fairly well in violet. Curves have rapid rise in ultra-violet similar to cholesterin. All three types of animals have almost same absorption curve for blood corpuscles in visible and ultra-violet.
Work covers λ 5000 - 2300 Å. Plasma band at λ 2800 Å, Blood corpuscles bands at λ 4100 Å, 3280 Å, 2750 Å.
A, c; I,1,2; (2).

260. Suhrmann, R. and Kollath, W.
Über die Absorptionsspektren des Blutes und ihre Beziehung zur Rachitis. Strahlentherapie, 41:169-170, 1931.
Polemic with Gibbs, Johns and Shapiro
Authors admit weakness of their test for rickets.
C; I,1,2,4; (3).

261. Suhrmann, R., Kollath, W. and Leichtentritt, B.
Quantitative Messungen im sichtbaren und ultrabioletten Absorptionsspektrum des Blutes und seiner Bestandteile. IV. Xerophtalmie und Rachitis. Strahlentherapie, 32:389-402, 1929.
Light absorption in visible and ultra-violet down to λ 2340 Å investigated for plasma and blood corpuscles, for xerophthalmic or rachitic rats. Plasma in xerophthalmia shows in absorption curve for visible and ultra-violet very definite differences. Blood corpuscles unchanged. In rachitis absorption of plasma unchanged, absorption of blood corpuscles shows decrease in short visible and increased absorption in ultra-violet.
A,c; C; I,1,2; (3).

262. Suránji, G. and Vermes, M.
Einfluss der ultravioletten Bestrahlung auf die Atmung von Vogelerythrocyte und Hefezellen. Magy. orv. Arch. 30:585-590, 1929.
During aerobic or anaerobic irradiation of suspensions of above cells an increase of respiration was noticed. Increase is reversible and falls off after 1 1/2 hours (Ber. Ges. Physiol.)
G,e; I,4; (3).

263. Tappeiner, H. v.
Untersuchungen über den Angriffsort der fluorescierenden Substanzen auf rote Blutkörperchen. Biochem. Ztschr., 13:1-23, 1908.
Photodynamic effect of several pigments, especially methylene blue, on blood corpuscles.
I,1,4,5; II,2; (4).

264. Terwen, A.J.L. and Liechtenstein, A.
Über Blutmauserung und Urobilinausscheidung. Deutsches Arch. f. klin. Med., 149-102-112, 1925.
Use of Terwen's method in study of hemolytic icterus and pernicious anemia.
A,d; VII; (6).

265. Thomas, J.
Contribution à l'étude du pouvoir rotatoire du sucre sanguin. Compt. rend. Soc. de biol.,
Studies on rotating power of blood sugars.
F,c; IV,1; (6).

266. Thomas, J.
Variation du pouvoir rotatoire du glucose sanguin en fonction du pH. Compt. rend. Soc. de biol., 105:894-896, 1930.
F,c; IV,1; (5).

267. Thomas, J.
Contribution à l'étude du pouvoir rotatoire du sucre sanguin. Bull. soc. biol. 113:377-394, 1931.
Study on difference in optical rotation of blood sugar and stable glucose (β).
F,c; IV,1; (3).

268. Treplin, L.
Klinische Bemerkungen zu den Blutuntersuchungen Karzinomkranker. Strahlentherapie, 42:704-708, 1931.
A,f; F,a,b; I,1,2,3,4; II,2; (4).

269. Tsukamoto, S.
The effect of the lights of varied wave-lengths upon the survival length of leucocytes in vitro. Tr. Soc. Path. Jap. 23:70-71, 1933.
Author used Christiansen filters for separating different colors. His conclusion is that the shorter the wave length the greater is the injurious effect of the light. (Apparently no energy controls used).
I,4; (6).

270. Urban, G. v.
Quantitativer spektrographischer Nachweis von Kohlenmonoxyd im Blut. Ztschr. f. d. ges. exper. Med., 81:295-297, 1931.
Author was able to determine as little as 5% CO in small quantities of blood.
I,1,2; (6).

271. Vogelaar, J.P.M., and Wartman, W.B.
The influence of ultraviolet light on plasma clot formation. Am. J. M. Sc. 182:605-610, 1931.
Author's summary: There is a gradual increase in the transparency of a clot formed by calcifying citrated blood plasma which has been irradiated with ultra-violet from 1 to 4 hours.
I,4; (3).

272. Vollmer, H., and Lee, S.
Photoaktivitätsstudien. III, Mitteilung. Blutzuckerwirkung photoaktiver Substanzen. Biochem. Ztschr., 173:467-475, 1926.
Apparently there is no connection between hyperglykaemic and photoactive effects.
F,a; C; I,4,5; II,2; (3).

273. Warburg, O., and Kubowitz, F.
Ist die Atmungshemmung durch Kohlenoxyd vollständig? Biochem. Ztschr., 214:19-23, 1929.
Respiration stoppage through CO can be accomplished experimentally up to 99%.
F,b; VII; (6).

274. Warburg, O.
Über die chemische Konstitution des Atmungsfermentes. Ztschr. f. Elektrochem. 35:549-551, 1929.
Review of work on the respiration enzyme.
B; F,b; I,1,2,4; (1), (4).

275. Welker, W. and Williamson, C.
Hemoglobin I. Optical constants. J. Biol. Chem. 41;75-79, 1920.
Not sufficient difference in absorption coefficients of the hemoglobin of various species to serve as a means of identification of the species.
F,b; I,1,2; (3).

276. Whipple, G.H.
Pigment metabolism and regeneration of hemoglobin in the body. Arch. Int. Med., 29:711-731, 1922.
Review of problem in connection with pigment formation in the body.
F,b; H,c; I,1,2; (4).

277. Willstätter, R. and Fischer, M.
Untersuchungen über den Blutfarbstoff. I. Mitteilung - Über den Abbau des Hamins zu den Porphyrinen. Ztschr. f. physiol. Chem. 87:423-498, 1913.
F,b; I,1,2; (4).

278. Wohlgemuth, J. and Szörényi, E.
Über die Wirkung des Lichtes auf den Chemismus der Zelle. II. Versuche an roten Blutkörperchen. Biochem. Ztschr., 264:389-405, 1933.
If red blood corpuscles are irradiated in presence of hematoporphyrin, methemoglobin is formed. Hematoporphyrin increases respiration of erythrocytes. If erythrocytes are irradiated with light during respiration experiments, oxygen consumption increases 300-400%. This happens also in hemolyzed blood. Effect of photodynamic substances discussed.
Interesting paper.
F,b; I,4,5; (2).

279. Wright, S., Herr, E., and Paul, J.
The relationship of lactic acid to the optical activity of normal and diabetic blood before and after glycolysis. J. Bio. Chem. 80:571,587,1928.
"A study has been made on the levorotatory substances which are formed at the expense of glucose as a result of the glycolytic action of animal and human blood and evidence has been brought forward to favor the assumption that these levorotatory substances represent in large measure the salts of d-lactic acid."
F,c; IV,1; (3).

280. Ziemke, E. and Müller, F.
Beiträge zur Spektroskopie des Blutes. Arch. f. Physiol. Supple.Bd. 177-185, 1901.
Absorption spectra of the different blood pigments.
F,b; I,1,2; (5).

281. Zilzer, V.
Spektrophotometrische Studien an Blutfarbstoff und Derivaten. Biochem. Ztschr., 179:348-363, 1926.
Discusses in detail effect of suspension of particles on absorption of light in oxyhemoglobin, hemin, hematoporphyrine.
F,c; I,1; III,1; (6).

See also:

284, 296, 311, 318, 322, 323, 324, 326, 363, 373, 375, 376,
384, 386, 390, 407, 420, 421, 424, 430, 432, 452, 453, 469,
476, 485, 502, 505, 551, 562, 597, 600, 601, 604, 610, 630,

636, 640, 671, 673, 685, 689, 694, 702, 712, 716, 749, 767,
785, 786, 789, 825, 884, 912, 918, 928, 931, 932, 940, 941,
942, 943, 944, 946, 947, 948, 1049, 1103, 1104, 1171, 1180, 1219,

1237, 1258, 1266, 1270, 1291, 1303, 1304, 1307, 1318, 1341, 1345, 1347,
1348, 1355, 1357, 1363, 1365, 1366, 1380, 1392, 1393, 1394, 1395, 1396,
1407, 1418, 1419, 1420, 1427, 1436, 1446, 1468, 1481, 1490, 1497, 1505,

1506, 1508, 1511, 1515, 1520, 1522, 1526, 1527, 1528, 1532, 1534, 1535,
1537, 1538, 1539, 1540, 1541, 1542, 1544, 1545, 1552, 1553, 1554, 1556,
1557, 1560, 1561, 1572, 1573, 1574, 1576, 1577, 1579, 1580, 1582, 1583,

1590, 1607, 1609, 1610, 1620, 1626, 1628, 1634, 1635, 1639, 1641, 1647,
1648, 1651, 1667, 1669, 1672, 1674, 1675, 1676, 1677, 1678, 1679, 1680,
1683, 1688, 1705, 1710, 1717, 1721, 1724, 1725, 1726, 1727, 1728, 1729,

1731, 1737, 1742, 1746, 1748, 1750, 1753, 1755, 1767, 1780, 1783, 1787,
1788, 1793, 1800, 1821, 1892, 1945, 2096, 2109, 2110, 2126, 2127, 2128,
2131, 2139, 2228, 2290, 2366, 2422, 2497, 2586, 2587, 2636, 2726, 2788,

2828, 2868, 2938, 3102, 3147, 3216, 3236, 3246, 3261, 3300, 3313, 3336,
3337.

A. BODY FLUIDS AND TISSUES

c. Blood serum

282. Becher, E.
Studien über Chromogene in Serum und Harn von Nierenkranken und über Entstehung der hellen Harnfarbe bei Schrumpfnieren. Deutsches Arch. f. klin. Med., 148:46-57, 1925.
In light colored urine of contracted kidneys, urochromogen as well as a number of other chromogens were shown to be present. Appearance of urochromogen in other diseases discussed at length as well as possible location of chromogen formation.
A,d; F,b; I,1,2; VII; (3).

283. Beckmann, K.
Spektrophotometrische Gallenfarbstoffuntersuchungen im Blutserum. Verhandl.d.deutsch. Gessellsch. f. inn. Med., 33:481-483, 1921.
Clinical importance.
A,d,e; F,b; I,1,2; (6).

284. Bendien, S.G.T.
Specifische Veranderungen des Blutserums. Ein Beitrag zur serologischen Diagnose von Krebs und Tuberkulose. pp.99. Gustav Fischer. Jena,1931.
Precipitation of serums of healthy persons, serums of persons with cancer, tuberculosis, and number of other diseases, as well as anti-diphtheria, tuberculosis sera, etc. tested with acetic acid, and sodium vanadate mixtures. Absorption spectra taken of many of the materials investigated. Excellent illustrations. Results encouraging enough to warrant further work. Good discussion of absorption spectrophotometry, favoring German work. (221 references.)
A,b,e,f; G,b,c; H,a; I,1,2; (2). (4).

285. Bendien, W.M. and Snapper, J.
Abtrennung von Serumkolloiden durch Ultrafiltration. Acta neerl. Physiol., 1:69-71, 1931.
VII; (3).

286. Bergh, H. van den and Snapper, J.
Die Farbstoffe im Blutserum. Deutsches Arch. f. klin. Med., 110:540-561, 1931.
See book for results of this paper.
I,1,2; F,b; (6).

287. Bovie, W.T.
The action of the extreme ultra-violet of tropical sunlight on the complementing power of serum. J. Med. Research, 38:335-344, 1918.
General discussion. See Brooks' articles.
F,a; G,b; I,4; (4).

288. Brauer, L., Goos, F. and Heller, C.
Spektrometrische Untersuchungen am Blutserum Carcinomatöser. Strahlentherapie, 41:599-600, 1933.
Contrasting their results with those of Dannmeyer, Hartleb and Schubert, using a photographic method, authors could find large differences in the absorption spectrum in the serum of individual persons, but no uniformity for carcinoma or healthy persons. Variation was very large, and conclusion can be made only from very large number of cases. Since financial means to conduct such an extensive investigation were not available, the matter was dropped.
A,f; I,1,2; (2).

289. Broekmeyer, J.
Quantitative Indicanbestimmung im Blutserum. Klin. Wchnsch., 12: 1025-1026, 1933.
Clinical importance.
F,b; I,1,2; (6).

290. Careddu, G.
Variazioni del pH. e del contenuto di fosforo inorganico nel siero irradiato con raggi ultravioletti. Biochim e terak sper. 18:109-115, 1931.
Serum irradiated with ultra-violet light in quartz vessels in vacuum shows increase of inorganic phosphorus and a lowering of the pH. Possible explanations are discussed. (Zentralbl. f. Radiol.)
I,4; (3).

291. Cluzet, J. and Kofman, T.
Variations de l'indice de réfraction du sérum et du plasma soumis à l'ultra-violet. Compt. rend. Soc. de biol., 98:978-979, 1928.
Refractive index of radiated serum was different from that of non-irradiated serum.
F,b; I,1,4; V,2; (3).

292. Courmont, P., Nogier, and Dufourt, A.
Disparition de l'alexine des sérums par les rayons ultraviolets. Compt. rend. Soc. de biol., 74:1152-1153, 1913.
The hemolytic effectivity of certain serums is destroyed by the light from a quartz mercury vapor lamp.
F,a; G,b; I,4; (6).

293. Damianovich, H., Williams, A.T., and Mathen, C.P.
Spektrophotometrische Untersuchungen über die Absorption der Ultravioletten strahlen durch das Blutserum. (Spanish) An. del inst. Modelo clín. med., 10:168-185, 1927.
The absorption coefficient of the serum of patients with liver and bile diseases is higher than the coefficient for normal people. But occasionally also the opposite could be found. (Ber. d. ges. Physiol.)
I,1,2; (6).

294. Dannmeyer, F., Hartleb, O. and Schubert, J.
Spektrometrische Untersuchungen am Blutserum Karzinomatöser. Die Krebskurve. Strahlentherapie, 42:648-674, 1931.
A detailed investigation of the blood serum. Technique is discussed. Change of the absorption curve of the serum of carcinomatous persons in relation to the chemical changes taking place in the blood, especially the release of certain sugars.
A,f; I,1,2; (2).

295. Dannmeyer, F., Hartleb, O. and Treplin, L.
Spektrometrische Untersuchungen am Blutserum Carcinomatösen. Strahlentherapie, 48:199-200, 1933.
Polemic against Brauer, Goos and Heller. Dannmeyer blames the photographic method for negative results. Dannmeyer used v. Noël's extracts and the other investigators did not. Work has now been repeated many times with positive effects.
A,f; I,1,2; (3).

296. Davis, G.E. and Sheard, C.
The spectrophotometric investigation and determination of bilirubin. J. Lab. & Clin. Med., 19:593-608, 1934.
Ultra-violet and visible absorption spectrum of bilirubin in blood serum. Data on the visibility of small amounts of oxyhaemoglobin in water and in blood serum, and on the effects of traces of this pigment in spectrophotometric investigations of the components of serum, particularly bilirubin. Characteristic spectra of serum bilirubin, serum oxyhaemoglobin and an oxygenated solution of purified haemoglobin in alkalized water shown and discussed. Some constants of the absorption spectra of serum bibirubin evaluated. Method of calculating the spectrum of a small amount of oxyhaemoglobin in serum and of correcting the observed spectrum.
A,b,d; F,b; I,1,2; (3).

297. Delbet, P. and Beanoy, A.
Étude comparée de l'action des rayons ultraviolets sur le pouvoir hémolytique et sur l'état colloïdal du sérum sanguin. Compt. rend. Acad. d. sc., 159:278-281, 1914.
Action of ultra-violet light investigated for its effect on the hemolytic property and colloidal state of blood serum. The hemolytic property of serum is destroyed by ultra-violet light, although the colloidal state of the serum is apparently not changed.
G,b; F,a; I,4; (3).

298. Du Noüy, P.
Recherches sur la température critique du sérum (55°-58°) au moyen des mesures photométriques. (III mém.) Ann. Inst. Pasteur 44:109-123, 1930.
Effect of heat on serum, change of viscosity, diffusion coefficient, rotation dispersion, and absorption coefficient.
I,1,2; III,1; IV,1; (3).

299. du Nouy, P.L.
Transmission and diffraction of light by normal serum as a function of the temperature. Science, I:108, 1930.
(See extensive article on same subject).
I,4; III,1, (3).

300. du Nouy, L. and P.L.
Spectrophotométrie du sérum dans le visible. Compt. rend. Soc. de biol., 108:657-659, 1931.
Absorption spectrum of horse serum for λ4000 to 8400 Å
I,1,2; (2).

301. du Nouy, P.L. and M.
Etudes sur la température critique du sérum. Spectre d'absorption du sérum de cheval dans l'ultraviolet. Compt. rend. Acad. d. sc., 194: 1815-1817, 1932.
Absorption spectra of horse serum at room and at higher temperatures given for λ4000 to λ2250 Å. Where maximum at λ2000 Å is fairly constant, minimum at λ2550 Å shifts somewhat at 65° C.
I,1,2; (3).

302. du Nouy, P. L., and M.
Recherches sur le sérum et sa température critique.16. Le spectre d' absorption due sérum dans l'ultra-violet, le visible et le proche infra-rouge. Ann. Inst.Pasteur, 49:762-777, 1932.
Absorption spectra for serum for λ 2300 Å to λ 6000 Å. Significance of absorption bands discussed only slightly.
I,1,2; (3).

303. du Nouy, P.L., et M.L.
Spectrophotométrie due sérum dans l'ultra-violet. Sur une altération chimique profonde des protéines, suivie de mort. Compt. rend. Soc. de biol., Paris, 112:1267-1269, 1933.
Human serums usually will not show much difference in their absorption spectra, but if serums are heated to 55 to 65° C, they may show differences, which may have important diagnostic significance. One case is mentioned where the serum of the patient showed distinct differences in its absorption spectrum but where clinical tests did not show anything. The patient died after a few days.
F,a; I,1,2; (2).

304. Ettisch, G. and Ewig, W.
Zur Elektrodialyses des Serums. Biochem. Ztschr., 195:175-188, 1928.
A detailed discussion of factors influencing electrodialysis of serum.
H,a; VII; (3).

305. Ettisch, G. and Sachsse, H.
Zur Frage der chemischen Selbstständigkeit der Serumproteine. Biochem. Ztschr., 230:129-135, 1931.
F,a; VII; (3).

306. Feigl, J.
Neue Beobachtungen zur Kasuistik des Vorkommens von Hämatin im menschlichen Blutserum. I. Biochem. Ztschr., 85:171-187, 1918.
Occurrence of hematin in human blood serum in certain pathological cases discussed.
F,b; I,1; (6)

307. Frontali, G.
Influence dei raggi ultravioletti sul siero irradiato fuori dell' organismo. I. Comm.: P. inorganico e pH. Riv. di clin. pediat., 25:661-668, 1927.
Blood serum exposed to light from a quartz-mercury-vapor lamp in quartz vessels showed an increase of inorganic phosphorus and a lowering of pH. (Ber. d. ges. Physiol.)
I,4; (3).

308. Genner, V.
The influence of chemical light baths on the bactericidal processes in the blood and the serum. Acta radiol. (Stockholm), 5:172-195, 1926.
Not able to check results of Colebrook, Eidinow and Hill on bactericidal optimum in rabbit serum 2 hours after light-bath treatment of animal.
G,c; I,4; (3).

309. Giaume, C.
Anafilassi e sieri irradiati con raggi ultraviolette. Pathologica, 20: 236-241, 1928.
Animals sensibilized with normal serum do not receive shock if treated with serum irradiated with ultra-violet.
I,4; (3).

310. Goebel. W.
Einwirkung des Ultraviolettlichtes auf die Serumkolloide. Biochem. Ztschr., 190:95-100, 1927.
Surface tension of blood serum changes if irradiated with ultra-violet in vivo. Higher surface tension of serum of people living only for a short time in high altitude mountain climate. General physiological importance. Paper suggests many interesting problems for investigator approaching subject from physical side.
I,2,4; VII; (3),

311. Graubner, W.
Quantitative spektrographische Untersuchungen im ultravioletten Teil des Spektrums. II. Mitteilung, Ztschr. f.d. ges. exper. Med., 81:1-5, 1932. Ztschr. f.d. ges. exper. Med.
The characteristic absorption of serum at λ 2800 Å as well as of ether fluids is caused by an organic compound which contains either a benzine or carbonyl group. Cannot be identified with any known serum compound. Method: photographic spectrophotometry. The absorbing substance could not be a fat or a cabohydrate. If the serum is distrilled at 100° the band still appears in the residue. Resembles the adrenalin spectrum. The band is not changed by a number of diseases, with the exception that when the suspension (serum) gets clouded, the band is blotted out.
A,b; F,a; I,1,2; (2).

312. Heilmeyer, L.
Das Verhalten des Kongorots zu den Serumkolloiden, zugleich ein methodischer Beitrag zur Blutmengenbestimmung mit Kongorot nach Griesbach. Biochem. Ztschr., 212:430-442, 1929.
Kongo red in serum solution has a different absorption spectrum from water solution. For this reason, Griesbach and Schmidt method cannot be used. Author recommends use of Pulfrich's step-photometer in place of above (Griesbach and Schmidt) method.
Clinical importance.
I,1,2; (3).

313. Heilmeyer, L.
Zur spektralen Analyse der normalen Serumfarbe. Klin. Wchnschr., 11: 1349-1352, 1932.
Lipochromes present in in only small amounts. The Spectra obtained by P. Müller, Heilmeyer reports, were caused by the selective sensitivity of the photographic plate at λ 4900 Å. Hemoglobin responsible for very little of color of serum. Main color of serum caused by bilirubin.
F,b; I, 1,2; (3).

314. Heilmeyer, L. and Krebs, W.
Spektrophotometrische Untersuchungen des Ehrlich-Pröscherschen Bilirubin Azofarbstoffes und ihre praktische Anwendung, besonders zur quantitativen Bestimmung des Bilirubins im Blutserum. Biochem. Ztschr., 223:352-364, 1930.
Describes a method for quantitative determination of serum pigments. Through diazotizing of alcohol extracts of serum it is found that there is no difference in absorption spectra of different bilirubins. Use of Zeiss step-photometer recommended.
F,b; I,1,2; (3).

315. Heilmeyer, L. and Krebs, W.
Bestimmung der Harnsäure im Blutserum mit dem Zeissschen Stufenphotometer unter besonderer Berücksichtigung der optischen Grundlagen. Biochem. Ztschr., 223:365-372, 1930.
Uric acid determination standardized with absorption spectrum of uric acid-phosphotungstic acid pigment. New method of determining uric acid with Zeiss's step-photometer given.
A,d; F,b; H,a; I,1,2; (3).

316. Heilmeyer, L. and Toop, H.
Spektrophotometrische Farbstoffanalyse des Blutserums. Klin. Wchnschr., 10:1816, 1931.
See detailed article in Ztschr. f.d.ges. exper. Med.
F,b; I,1,2; (3).

317. Heilmeyer, L. and Toop, H.
Klinische Farbmessungen. XII. Die spektrophotometrische Farbstoff - analyse des Blutserums mit besonderer Berücksichtigung des Bilirubin- und Carotinspektrums. Ztschr. f. ges. exper. Med., 80:603-632, 1932.
Absorption spectra of normal and pathological blood sera and of horse serum determined with the König-Marten's photometer (visible only). Different sections of the absorption spectra discussed in detail. A "typical" absorption curve for sera discussed.
F,b,a; I,1,2; (2).

318. Heilmeyer and Wappler.
Klinische Farbmessungen. VI. Die normale Serumfarbe. Ztschr. f.d.ges. exper. Med., 63:630-642, 1928.
Good review of serum color. Pulfrich's step photometer used. In obtaining the serum special care must be taken that it is colorless. Three filters used: λ 6000 - 8000 Å, λ 5300 - 5700 Å, λ 4300 - 4850 Å.
Lowest absorption in red. Composition of the serum pigment constant. Lipemic serum of healthy people clear. Only a weak Tyndall effect. Nephritis and diabetes serum even before eating, very cloudy, caused by fats. Cloudy serum may transmit more light than clear serum.
Hemolysis important. Stopping of circulation will increase absorption. Standing in dark will not cause changes, but standing in light gives striking changes. These changes caused by change of bilirubin to biliverdin (green).
Blue is the one color of the serum which changes little. Values for the extinction coefficient between 0.5 - 1.0 are normal. Below and above they are pathological.
A,b; F,b; I,1,2; (2).

319. Henri, V. and V., and Wurmser.
Etude quantitative de l'absorption des rayons ultraviolets par l'albumine d'oeuf et le sérum. Compt. rend. Soc. de biol., 73:319-320, 1912.
Short ultra-violet light is highly absorbed by egg albumin and serum.
F,a; I,1,2; (3).

320. Hoeber, R.
Sobre la naturaleza fisicoquimica de los efectos biologicos de origen actinico. Med. Germano-Hispano-Americana 1:113-116, 1923.
Exposure of horse serum to ultraviolet light renders the serum more acid. (Physiol.Abstr.)
I,4; (6).

321. Kämmerer, H.
Fluorescenzdiagnose. München. med. Wchnschr., 78:1711-1712, 1931.
Polemic against Reche.
II,2; (3).

322. Karczag, L. and Hanak, M.
Spektrographische Studien an menschlichen Körperflüssigkeiten. Biochem. Ztscher, 245:166-173, 1932.
Blood serum of man has an absorption band with a maximum at λ 2800 Å and minimum at λ 2530 Å. It is additive, consisting of the absorption curve of globulin and albumin. Changes in the protein fractions, such as age, blood group and disease, have no influence on the normal selective absorption of blood serum. Artificial changes like heating to 56° C., formol, formol - NaOH treatment, x-rays create in all sera the same changes. Not all ultrafiltrates show pure uric acid curves.
The absorption curve of cerebrospinal fluid is an interference curve consisting mainly of the curves of proteins and uric acid.

The formol treatment of spinal fluid is in positive contrast to the serum in that it brings about changes in selective absorption. The absorption curve of the spinal fluid ultrafiltrate shows a flatter curve and is displaced towards higher extinctions.
A,b,d,e; F,a; I,1,2; (2).

323. Karczag, L. and Hanák, M.
Spektrographische Untersuchungen an Körperflüssigkeiten Krebskranker. Ztschr. f. Krebsforsch., 35:153-160, 1932.
Native blood sera of cancer patients not different in absorption from that of healthy people. Artificial influences such as heat inactivation produce the same effects in healthy and diseased sera. In carcinomatous patients the blood serum ultrafiltrate shows a flattening out of band at λ2800 A; The cerebro spinal fluid absorption curve is also usually flatter, and the spinal fluid ultrafiltrate without showing selective absorption has increased end absorption.
A,b,e,f; I,1,2; (2).

324. Kollath, W. and Suhrmann, R.
Über die Absorption des ultravioletten Lichtes durch Blut, Serum und Lipoide. Ztschr. f. wissensch. Bäderk., 2:781-784, 1928.
Review of authors' work on above materials.
A,b; F,a; I,1,2; (4)

325. Kroetz, C.
Zur Biochemie der Strahlenwirkungen. II. Der Einfluss der ultravioletten und Röntgenstrahlung auf den Wassersalz-und Eiweissbestand des Serums. Biochem. Ztschr., 151:449-466, 1924.
A,f; I,4; VI,2; (3)

326. Kronacher, C. and Hogreve, F.
Über einen neuen experimentellen Weg der Konstitutions und Rasseforschung mittels lichtelektrischer quantitativer Absorptionsmessungen im Ultraviolett am Serum. Z. Züchtg., B. 18:366-397, 1930.
Differences in absorption spectra of undiluted serum of different races of cattle and horses noted.
A,b; I,1,2; (2).

327. Lederer, E.L.
Kolloidchemische Voruntersuchungen an Seren, besonders Karzinomatöser. Die Schutzzahl. Strahlentherapie, 42:675-683, 1931.
Reaction for the determination of protective number of sera toward Prussian blue for the detection of cancer. Results are preliminary.
A,f; I,2, VII; (3).

328. Lewis, S.J.
The ultra-violet absorption spectra of blood sera. Proc. Roy. Soc., London, B, 89:327-335, 1917.

"Practically all the properties of the absorption curve of normal serum have proved to be constant and characteristic, while there is enough variation in minutiae to stimulate a closer investigation with a view to ascertain the range and causes of the variations, and the much greater, though still small changes associated with certain pathological conditions make the inquiry all the more urgent and interesting. The method lends itself

to the purposes of clinical practice, for so small a quantity as four or five drops of blood collected in the capillary tube suffice for a complete examination in the ordinary way. Again, no preparation whatever of the specimen is necessary except to separate the serum in the containing tube by means of the centrifuge and then to transfer it to the observation cell."

The sera of the horse and man were investigated. The absorption is caused by the proteins since proteinfree material will only start absorbing at λ 2100 A. The absorption spectra have many interesting features. Good indications of fine structure. Changes in the absorption spectra observed in the following diseases: typhoid, scarlet fever, tuberculosis. Four cases of anemia did not show any difference.

F,a; G,b; I,1,2,3; (2).

329. Lewis, S.J.

The ultra-violet absorption spectra and the optical rotation of the proteins of blood sera. Proc. Roy. Soc., London, B., 93:178-194, 1922.

Object of investigation was to find the contribution made by each protein constituent of serum to the ultra-violet absorption spectrum curve of blood serum. The absorption of pseudo-globulin is constant, and is the same for both horse and human varieties. The absorption curve for eu-globulin differ considerably from that for pseudo-globulin in extinction coefficients, but not in general form. This favors view that differences between pseudo-globulin and eu-globulin do not result from differences in structure of the chemical molecule. The absorption curves for horse and human varieties of albumin have been shown to be the same, except for a constant ratio in their magnitudes, and this difference may be due to the physical or possible chemical association of an aggregate, possessing little or no selective absorption power - for example, an aliphatic amino-acid or a polypeptide wit the principal or absorbing aggregate. The close similarity in form of all the curves when corrected to a common amplitude and the fact that the amplitudes are nearly simple multiples of a common factor, point to similarity of constitution amongst these proteins and to a variable "concentration" of the active group. The optical properties of the proteins of sera have been investigated. The work contained several interesting points.

F,a; I,1,2; IV,1; (2).

330. Loeb, L.

Uber das Vorkommen von Urobilinogen im Blutserum. Biochem. Ztschr., 244:426-430, 1932.

Author feels that investigation which was believed to have shown presence of urobilinogen and urobilin in blood serum will not stand criticism. It has been possible to show spectroscopically presence of aldehyde condensatior product of urobilinogen.

F,b; I,1,2; (3).

331. Magath, T.B. and Sheard, C.
Spectrophotometric analysis of blood serum in normal and pathologic conditions. Arch. Int. Med., 39:214-225, 1927.
Yellow pigment in blood serum is bilirubin in normal persons and in those suffering from malaria, pernicious anemia, hemolytic icterus and jaundice due to obstruction of bile. Degree of bilirubinemia varies so that order named indicates relative amounts. If bilirubins are different it is not shown in the type of spectrophotometric curve. Usually one hour after transfusion in cases of pernicious anemia, the serum shows an increase of bilirubin. Any process resulting in too rapid destruction of blood or too slow excretion of bile results in retention of bilirubin. Combinations of both factors probably play part in clinical picture and spectral analysis. Fundamentally all jaundice is hemolytic. (Authors' summary.)
A,e; F,b; I,1,2; (4).

332. Mertens, E.
Farbstoffe des Serums. Handb. d. allgem. Hämatologie. Pp. 923. Berlin: Urban and Schwarzenberg, 1934.
Author discusses pigments of the serum under following headings: hemoglobin-oxyhemoglobin. Methemoglobin (sulfhemoglobin, hematin, bilirubin, urobilin, urobilinogen, porphyrine, carotinoide). Most up-to-date review. 537 references.
F,b; I,1,2; (1), (4).

333. Müller, P.
Der Hämoglobingehalt des normalen Serums. Klin. Wchnschr, 11:1352-1353, 1932.
Polemic against Heilmeyer. Proof is brought that the yellow color of the serum is caused by the haemoglobin and not by bilirubin. The λ 4900 Å band is a lipochrome band and not caused by the different sensitivity of the plate.
F,b; I,1,2; (3).

334. Müller, P.
Spektrochemische Analyse der Serumfarbstoffe. Klin. Wchnschr., 11:189-192, 1932.
Good general review on serum pigments.
F,b; I,1,2; (4).

335. Müller, P. and Engel, E.
Das spektrale Verhalten des Bilirubins und seine spektrophotometrische Bestimmung im Serum. Verhandl. d. deutsch. Gessellsch. f. inn. Med., 43: 393-397, 1931.
Report of a lecture with interesting discussion.
F,b; I,1,2; (3).

336. Müller, P. and Engel, L.
Über das Absorptionsspektrum des Bilirubins in verschiedenen Lösungsmitteln. Ztschr. f. physiol. Chem. 202:56-66, 1931.
Absorption spectrum of bilirubin in human serum and chloroform as well as spectra of diazotized sera discussed.
F,b; I,1,2; (3).

337. Mutzenbecher, P. v.
Die Analyse des Serums mit der Ultrazentrifuge. Die Fraktionen des Serums Dissoziationen und Assoziationen der Serummolekule. Biochem. Ztschr., 266:250-258, 1933.
VII; (6)

338. Mutzenbecher, P. v.
Dissoziationen und Assoziationen der Serummolekülle. Biochem. Ztschr., 266:259-265, 1933.
VII; (6).

339. Niederhoff, P.
Die Verwendung der Lichtzerstreuung zur Charakterisierung organischer Flüssigkeiten. 12. Tagung der Deutschen Physiol. Gesellsh. Bonn, May 26-29, 1931.
Short notice of a lecture. Scattered light studied spectrally as well as with a polariscope. A number of human and animal sera studied.
I,1,2,4; III,1; IV,1; (3).

340. Niederhoff, P.
Über die Verschiedenheit des von normalen und pathologischen Blutseren gestreuten Tyndall-Lichtes. Ztschr. f.d. ges. exper. Med., 79:329-332, 1931.
Author believes he has shown that serum from different sources will produce Tyndall scattering of different intensity at different wave lengths.
F,a; III,1,2; (3).

341. Niederhoff, P.
Über die Veränderlichkeit von Serum durch das Quecksilberlicht. Ztschr. f.d. ges. exper. Med., 90:529-533, 1933.
Serum irradiated with ultra-violet light for an extended time will show an increased Tyndall effect. Apparently absorption of shorter wavelengths increases.
F,a; I,4; III,1; (6)

342. Nöel, L.
Chemische Feststellungen am Serum Karzinomatöser. Die Krebszahl und weitere charakteristische Daten zur Krebsdiagnose. Strahlentherapie, 42:616-647, 1931.
Chemical side of the problem emphasized. Spectroscopic technique used only in search for typical absorption bands.
A,f; I,1,2; (3).

343. Okuniewski, S.S. and Penska, L.
La fluorescence des sérums. Compt. rend. Soc. de biol., 107:289-291, 1931.
Serums of different sources showed same blue fluorescence. If serum was infected with organisms, colour changed to green or brown. (Physiol. Abstr.)
II,2; (6).

344. Papendieck, A.
Zur Frage des Vorkommens von Porphyrin im Blutserum. Ztschr. f. physiol. Chem., 136:293-306, 1924.
No porphyrin found in serum of healthy or diseased persons. (See Fischer and Schumm.) Large number of spectograms given.
F,b; I,1,2; (3)

345. Peter, J.R.
Spektrophotometrische Bestimmung des Bilirubins im menschlichen Blutserum. Schweiz. Med. Wchnschr., 13:264, 1932.
Short notice of paper: Reports improvements on Mann's and Sheard's method of determining bilirubin in blood serum.
F,b; I,1,2; (6).

346. Peter, J.R.
Gesamtfarbstoff und Bilirubin im normalen menschlichen Blutserum. (Ein Beitrag zur spektrophotometrischen Bestimmung der Serumfarbstoffe.) Biochem. Ztschr., 262:432-460, 1933.
New method for purification of serum pigment. Pigment of blood or serum if kept in dark at low temperature changes only very little. Light absorption curves of serum extracts of healthy people contain some bands of lipochromes. Serum always contains more pigment than bilirubin value would indicate.
F,b; I,1,2; (2).

347. Ponthus, P.
Principe d'une étude photométrique de l'action in vitro des eaux minérales sur le sérum sanguin. Arch. de physique biol., 10:318-326, 1933.
Effect of water on blood serum on hand of absorption spectra.
I,1,2; (3).

348. Reche, O.
Fluorescenzdiagnose. München, med. Wchnschr., 78:1591-1593, 1931.
Fluorescence for diagnosis of blood sera recommended.
II,2; (6)

349. Reche, O.
Fluorescenzerscheinungen bei Blutseren. Ztschr. f. Rassenphysiol. 4:97-118, 1931.
Fluorescence of blood sera of 100 students investigated. Possible significance of spectra discussed.
II,2; (3).

350. Reche, O.
Neues zur Entdeckung von Fluorescenzerscheinungen bei Blutseren. Radiobiologia, 1:3-7, 1933.
Fluorescence of blood serum of normal persons has a band at λ 4500 Å and λ 5500 Å.
II,2; (3)

351. Schumm, O.
Über den Nachweis von Hämatin im menschlichen Blutserum. Ztschr. f. physiol. Chem. 87:171-181, 1913.
Study of presence of hematin in human serum in a number of pathological cases.
F,b; I,1,2; (3).

352. Schumm, O.
Bildung, Vorkommen und Merkmale des Hämatins, Nachweis und Bestimmung von Hämatin im Blutserum. Abderhalden's Handb. d. biol. Arbeitsmeth. II. Aufl. Abt. I., Teil 8, 365-382, 1922.
F,b; I,1,2; (4)

353. Schweizer, P.
Die Absorption von Seren gesunder und kranker Menschen im unsichtbaren Teile des Spektrums. Mitt.a.d.Grenzgeb.d.Med.u.Chir., 38:344-361, 1925.
Human healthy sera have very constant absorption spectra. Age and sex makes no difference. Sera containing bile pigment show very definite changes, carcinoma sera show small but definite differences, also case of mongolian idiocy showed definite changes in absorption spectrum of blood serum.
A,e,f; F,b; I,1,2; (2).

354. Scott, W.M.
Some effects of ultra-violet rays on serum. J. Path., & Bact., 16: 148, 1911.
Short abstract of report. See article.
G,b; I,4; (3).

355. Smith, C.S. and Marrack, J.R.
Further observations on the ultra-violet absorption spectra of the serum proteins. The specific extinction coefficient of serum pseudo-globulin. Proc. Roy. Soc., London, B 106:292-298, 1930.
Method of preparing and separating serum globulins does not affect their ultra-violet absorption spectra. Serum pseudo-globulin was found to obey Beer's law.
F,a; I,1,2; (3).

356. Smith, F.C.
The ultra-violet absorption spectra of uric acid and of the ultra-filtrate of serum. Biochem. J., 22:1499-1503, 1928.
Ultra-violet spectrum of uric acid in H_2O shows one band at λ2920 Å (head), λ2600 Å (foot), and one band at λ2350 (head), λ2210 (foot). In carbonate λ2950 Å or λ2630 Å, short band disappears.
Serum ultrafiltrate results shown for 13 healthy and 1 diseased person. Absorption of serum falls on that of uric acid. Values for concentration of uric acid from chemical and spectrographic data coincide.
One pathological case shows marked general absorption.
F,b; I,1,2; (2).

357. Smith, F.C.
The ultra-violet absorption spectra of certain aromatic aminoacids, and of the serum proteins. Proc. Roy. Soc., London, B., 104:198-205, 1929.
Ultra-violet absorption spectra of tyrosine, tryptophane and phenylalanine, and of serum proteins measured down to λ1950 Å. Two new bands in absorption spectrum (at short wave lengths) found. Absorption of horse and human serum proteins found in close agreement. Ratio <u>ext. coeff. at head of curve</u> - <u>ext. coeff. at foot of curve</u> - may be taken as index of purity of given sample of protein. Shown that error is not introduced by "scattering" of radiation due to colloidal condition of protein.
F,a; I,1,2,4; (2)

358. Stenström, W. and Goldsmith, N.
Determination of the dissociation constants of phenol and the hydroxyl group of tyrosine by means of absorption measurements in the ultra-violet. J. Physical Chem., 30:1683-1687, 1926.
Position of absorption bands of phenol, tyrosin, resorcin, paraoxybenzoic acid, salicylic acid, paraoxybenzaldehyde in water solutions depends on the pH. This fact studied in relation to the absorption spectra of sera.
H,a,c; I,1,2; (3).

359. Stenström, W. and Reinhard, M.
The influence of the pH upon the ultra-violet absorption spectra of certain cyclic compounds. J. Physical Chem., 29:1477-1481, 1925.
Absorption bands between λ2200 Å to λ3600 Å for the following compounds are dependent upon hydogen in concentration: phenol, tyrosine, resorcinol, paraoxybenzoic acid, salicylic acid and paraoxybenzaldehyde in water solutions. Position of bands seems independent of pH within experimental error for benzoic acid, phenylalanine and tryptophane in water solutions. Band will shift towards longer wave-lengths and increase in intensity when certain alkalinity has been reached by adding NaOH to water solution of compound. Compounds with hydroxyl group in benzene ring seem to show shift. Relation between the pH and wave length for which certain extinction coefficient is obtained was determined and plotted for phenol tyrosine and resorcinol. Curve showing shift for blood serum plotted.
F,a,c; I,1,2; (2).

360. Stenström, W. and Reinhard, M.
Ultra-violet absorption spectra of blood serum and certain amino acids. J. Biol. Chem., 66:819-827, 1925.
Absorption band around λ2800 Å of blood serum due to proteins present and is mainly the tyrosine and tryptophane constituents of proteins which are responsible for this band.
Absorption band of tyrosine shifts towards longer wave lengths and its intensity increases when solution is made alkaline. Absorption of blood serum changes in similar manner, but to smaller extent when hydrogen in concentration is reduced to $10^{-12.7}$.
Mixture of tyrosine, tryptophane, phenyl-alanine, cystine, glycine, leucine, and glutamic acid in the proportion indicated by analysis of blood serum (albumin and globulin) gives similar absorption curves. Curve at a pH of 12.7 agrees qualitatively with blood serum curve taken at same hydrogen in concentration. Quantitative agreement could be reached if amino acid solution were reduced 25%.
F,a; I,1,2; (2)

361. Stenström, W. and Reinhard, M.
Ultra-violet absorption spectra of blood sera in relation to infectious diseases and to cancer. Cancer, 9:394-403, 1925.
The absorption bands in the ultra-violet of Blood serum of animals and humans are fairly constant with exception that the absorption spectra seem to show some relation to sex, but none to blood group. Blood sera of cancerous persons do not show enough difference from that of healthy persons to distinguish them. Sera of rabbits immunized with B. prodigiosus and sheep corpuscles gave more intense absorption between λ2300-3100 Å.
A,f; F,a; G,b; I,1,2; (2).

362. See No. 343, p. 49.

363. Suhrmann, R., and Kollath, W.
II. Plasma und Serum. Strahlentherapie, 27:573-586, 1928.
Very good description of photoelectric method using a double monochromator down to λ 2340Å. Beer's law obeyed from c equals 0.04 to c - 0.005. Extinction coefficients for two different persons coincide perfectly. Plasma absorbs $<$300 Å stronger than serum. This probably caused by fibrinogen or blood corpuscles. Special care must be taken that material is not too much exposed to ultra-violet.
A,b; F,a; I,1,2; (2).

364. Tadokoro, T.
Ultraspectroscopic studies on blood serum. I. The antagonistic action of salt in blood serum. J. Infect. Dis., 26:1-7, 1920.
Author concludes that antagonistic action of two salts on blood serum is caused by a renewal of dispersion of serum and of change in form and structure of particles.
F,a; G,b; I,1,2,4; III,1; (3).

365. Tamura, A.
Adsorptionsschicht beim Menschenserum. III. Die Adsorptionsschicht bei mit Wasser und Ultraviolettstrahlen behandelter Menschenserumlösung. Acta scholae med. univ. imp. in Kioto, 16:253-256, 1934.
The adsorbed layer of serum on calcium chloride solution and isotonic salt solution changes when irradiated with the light from a quartz-mercury-vapor lamp as when diluted with water.
F,a; I,4; VII; (3).

366. Thannhauser, J.S., and Andersen, E.
Methodik der quantitativen Bilirubinbestimmung im menschlichen Serum über die Ehrlich-Pröscher'sche Reaktion. Deutsches Arch. f. klin. Med,, 137: 179-187, 1921.
F,b; I,1,2; (6).

367. Wels, P., and Jokisch, M.
Der Einfluss des bestrahlten Serums auf die Gefässwirkung des Adrenalins. Pflügers Arch. f. d. ges. Physiol., 223:395-406, 1929.
Cattle serum irradiated with ultra-violet contains a substance which is antagonistic to adrenalin. This adrenalin antagonist does not go over into the ultra-filtrate of the irradiated serum.
F,a; D; I,4; (3).

See also:

36, 49, 80, 84, 85, 87, 105, 123, 143, 150, 161, 162,
180, 203, 205, 216, 244, 247, 251, 255, 256, 257, 258, 259,
261, 375, 376, 384, 390, 404, 424, 435, 452, 462, 469, 470,

476, 482, 505, 600, 604, 640, 694, 719, 801, 914, 915, 1043,
1066, 1203, 1210, 1219, 1222, 1237, 1252, 1256, 1259, 1271, 1276, 1289,
1292, 1303, 1312, 1313, 1335, 1344, 1359, 1408, 1409, 1418, 1419, 1427,

1553, 1625, 1639, 1659, 1662, 1671, 1673, 1713, 1732, 1742, 1748, 1750,
1760, 1805, 1911, 2071, 2082, 2083, 2084, 2090, 2091, 2093, 2096, 2098,
2099, 2100, 2101, 2102, 2108, 2109, 2110, 2116, 2118, 2119, 2120, 2123,

2127, 2129, 2133, 2135, 2139, 2141, 2145, 2149, 2150, 2151, 2152, 2156,
2157, 2162, 2166, 2175, 2176, 2181, 2182, 2190, 2191, 2454, 2774, 2868,
3236, 3246, 3261, 3300.

A. BODY FLUIDS AND TISSUES

d. Urine

368. Adler, A.
Über Urobilin. I. Klinische Methode der (approximativ-) quantitativen Urobilinbestimmung in den Ausscheidungen des Körpers. Deutsches Arch. f. klin. Med., 138:309-320, 1922.
Clinical importance.
F,b; I,1; (6).

369. Adler, A.
Über fluoreszierende Oxydationsprodukte des Bilirubins und deren Bedeutung als Fehlerquelle bei den üblichen Urobilinnachweis. Biochem. Ztschr., 154:125-126, 1924.
Polemic against Barnenscheen and Weltmann.
H,a; I,1,4; II,2; (6).

370. Bauer, L.
Über die Bedeutung des reduzierten Harnfarbwerts für die Beurteilung der ambulant behandelten Kreislaufschwäche. Kongressverhandl. f. Inn. Med., 42:636-638, 1930.
Clinical importance.
F,b; I,1,2; (6).

371. Becher, E.
Untersuchungen über das Zustandekommen der gelblichen Hautfarbe und der blassen Harnfarbe bei schwerer Niereninsuffizienz. Kongressverhandl. f. inn. Med., 40:637-639, 1928.
Clinical importance.
A,f; I,1,2; (6).

372. Behrens, B.
Untersuchungen über Aufnahme, Ausscheidung und Verteilung kleinster Bleimengen. Arch. f. exper. Path. u. Pharmakol, 109:332-357, 1925.
A,f; II,1, VII; (4).

373. Bergh, H. v. d. and Grotepass, W.
Porphyrinämie ohne Porphyrinurie. Klin. Wchusch., 12:586-589, 1933.
A,b; F,b; I,1,2; (3).

374. Bollman, J. L., Mann, F. C., Magath, T. B.
Studies on the physiology of the liver. VIII. Effect of total removal of the liver on the formation of urea. Am. J. Physiol., 69:371-392, 1924.
Urea formation entirely dependent on liver.
A,f; I,1,2; (3).

375. Cluzet, J. and Kofman, T.
Sur l'absorption de l'ultra-violet par les liquides de l'organisme. Compt. rend. Soc. de Biol., 103:1123-1125, 1930.
The absorption spectra for urine, bile fluid, blood plasma, blood serum, and spinal fluid have been determined for λ 2300 to 3000 Å.
A,b,c,e; I,1,2; (3).

376. Borst, M.
Morphologie der Porphyrine. Naturwissensch., 18:1038-1041, 1930.
Review of work done under influence of H. Fischer. Occurrence of porphrines discussed.
A,b,c,e; F,b; I,1,2; II,2; (3).

377. Drabkin, D. L.
The normal pigment of the urine. I. The relationship of urinary pigment output to diet and metabolism. J. Biol. Chem., 75:443-479, 1927.
Good review of early literature as far back as 1600. Animal organism under controlled conditions eliminates a constant amount of urinary pigment, independent of diet. Tissue break-down or intensification of the cellular life process increases pigment output. Any stimulation will earn an increased output. Author believes that the pigment is not produced in the kidney. The pigment is biochemically unique. Increase by removing of the thyroid gland also in Graves' disease. Surface area and pigment have a constant proportion. From data on rat, dog and man.
I,1; III,1; (4).

378. Drabkin, D. L.
The normal pigment of the urine. II. The relationship of the basal metabolism to the output of the normal urinary pigment. J. Biol. Chem., 75:481-487, 1927.
More data showing that the quantity of pigment excreted is proportional to the metabolism. No color investigation was made. Only plain nephelometric work.
F,b; I,1,2; (2).

379. Eisenbrand, J.
Über eine Bestimmung der Harnsäure im Harn mit Hilfe ihres Absorptionsspektrums. Arch. d. Pharmazie, 268:520-536, 1930.
Experiments seem to show that it is possible through quantitative evaluation of the absorption spectra of urine to determine the uric acid percentage present therein.
F,b; I,1,2; (3), (4).

380. Fikentscher, R.
Quantitative Porphyrinbestimmung durch Lumineszenzintensitätsmessung mit dem Stufenphotometer. Biochem. Ztschr., 249:257-269, 1932.
A detailed discussion of the use of the Pulfrich step-photometer in the study of the fluorescence of porphyrine solutions. The method seems usable for the quantitative determination of porphyrines present in small percentages.
F,b; I,4; II,2,3; (3).

381. Fischer, H.
Über einen einfachen spektroskopischen Nachweis des Hemibilirubins im pathologischen Harn. München. Med. Wchnschr., 59:2555-2556, 1912.
A simple spectroscopic test of hemibilirubin.
F,b; I,1,4; (3).

382. Fischer, H.
Beobachtungen am frischen Harn und Kot von Porphyrinpatienten. Ztschr. physiol. Chem., 97:148-170, 1916.
A,e; F,b; VII; (6).

383. Fischer, H. and Zerweck, W.
Über den Harnfarbstoff bei normalen und pathologischen Verhältnissen und seine lichtschützende Wirkung. Zugleich einige Beiträge zur Kenntnis der Porphyrinurie. Ztschr. f. physiol. Chem., 137:176-241, 1924.
Extensive article gives first a detailed discussion of the literature on porphyrine, then the authors' own investigations on different pathological cases.
A,e; F,b; I,1,2, II,2; (1).

384. Fischer, H. and Zerweck, W.
Zur Kenntnis der natürlichen Porphyrine. V. Über Koproporphyrin im Harn und Serum unter normalen und pathologischen Bedingungen. Ztschr. f. physiol. Chem., 132:12-33, 1924.
A,b,c; I,1,2; F,b; (1)

385. Flückiger, M.
Untersuchungen über die Kupferoxydreduzierenden Substanzen des normalen Harns. Ztschr. f. physiol. Chem., 9:323-353, 1885.
Chemical experiments only.
VII; (5).

386. Garrod, A. E.
On the occurrence and the detection of hematoporphyrin in the urine. J. Physiol., 13:598-620, 1892.
A,b; I,1,2; F,b; (5).

387. Günther, H.
Die Hämatoporphyrie. Deutsches Arch. f. klin. Med., 105:89, 1911.
Clinical importance.
F,b; I,4,5; (6).

388. Günther, H.
Die klinischen Symptome der Lichtüberempfindlichkeit. Dermat. Wchnschr., 68:177-188, 1919.
F,b; I,4; (6).

389. Günther, H.
Die akute Hämatoporphyrinurie. Deutsches Arch. f. klin. Med., 134:257, 1920.
Clinical importance.
F,b; I,4,5; (6).

390. Günther, H.
Die Bedeutung der Hämatoporphyrine in Physiologie und Pathologie. Ergebn. d. allg. Path. u. path. Anat., 20:608-764, 1922.
Review of importance of porphyrines in physiology and pathology.
F,b; A,b,c; H,c; (4).

391. Hadjioloff, A. and Kresteff, T.
Examen à la lumière de Wood des urines de l'homme et des vertébrés. Compt rend. Soc. de biol., 106:662-664, 1931.
Causes of fluorescence of urine complex. Inorganic constituents of urine responsible for its fluorescence.
F,b; II,2; (3).

392. Hammarsten, O.
Über Hämatoporphyrin im Harn. Skandinav. Arch. f. Physiol., 3:319-343, 1892.
F,b; I,1,2; (5).

393. Hari, P.
Beiträge zur Lichtabsorption des Hämatoporphyrins. II. Biochem. Ztschr., 135:344-352, 1923.
Urine supposed to contain hematoporphyrine was investigated with König's spectrophotometer. The material found was similar to but not identical with hematoporphyrine.
F,b; I,1,2; (3).

394. Heilmeyer, L.
Klinische Farbmessungen. I. Die Harnfarbe in ihrer physiologischen und klinischen Bedeutung. A. Methodik und Ergebnisse am Normalharn. Ztschr. f. ges. exper. Med., 58:532-555, 1927.
A Pulfrich photometer was used. Detailed description of construction. Normal urine color, clouding effects, filtration, temperature, effect of standing in light and air, effect of acids and alkali, fuming nitric acid, broadness of variation of color, and total urine excretion in 24 hours.
F,b; I,1,2, III,1, VII; (2), (4).

395. Heilmeyer, L.
Klinische Farbmessungen. II. Die Harnfarbe in ihrer physiologischen und klinischen Bedeutung. B. Physiologische Ergebnisse. Ztschr. f. d. ges. exper. Med., 59:283-297, 1928.
Change of urine color during one day. Total amount of coloring material during one day is dependent on food. Influence of hunger, muscle work, sweating, nervous influences and caffein is discussed. General clinical importance.
F,b; I,1,2; (2).

396. Heilmeyer, L.
Klinische Farbmessungen. III. Die Harnfarbe in ihrer physiologischen und klinischen Bedeutung. C. Die Harnfarbe bei Leber- und Herzkranken. Ztschr. f. d. ges. exper. Med., 59:573-600, 1928. Med. Universitätsklinik, Jena.
Secretion of pigment changes during the day. All liver diseases gave an increased color in the urine. Urobilin is not alone responsible. In pathological births an increased urobilin content was found. General clinical importance.
F,b; I,1,2; (3).

397. Heilmeyer, L.
Klinische Farbmessungen. IV. Die Harnfarbe in ihrer physiologischen und klinischen Bedeutung. Ztschr. f. d. ges. exper. Med., 60:626-647, 1928.
General clinical importance.
I,1,2, (2).

398. Heilmeyer, L.
Klinische Farbmessungen. V. Die Harnfarbe in ihrer physiologischen und klinischen Bedeutung. Ztschr. f. d. ges. exper. Med., 60:647-664, 1928.
Use of photometer test for foreign or pathological coloring material. Recognition of medicaments in urine. Pathological conditions increased normal coloring materials. Improved analysis by the use of several filters. Lengthy discussion of the significance of the tests. Most important coloring material of the urine comes from the blood, and changed in normal persons by the liver to bilirubin gets into the intestine. The urobilin is formed in the intestine. In disease urobilin is excreted by the kidney. Some unknown pigments are still present. Clinical importance.
F,b; I,1,2; (2).

399. Heilmeyer, L. and Will, G.
Klinische Farbmessungen. VII. Die spektrophotometrischen Grundlagen der Harnfarbmessung mit dem Pulfrichschen Stufenphotometer. Spektrophotometrische Harnfarbanalysen bei Normalen, sowie bei Leberschädigung und gesteigerter Hämolyse. Ztschr. f. d. ges. exper. Med., 67:111-146, 1929.
F,b; I,1,2; (2).

400. Heilmeyer, L.
Klinische Farbmessungen. VIII. Die Farbstoffausscheidung beim Morbus Basedow, sowie im Thyroxinversuch, zugleich ein Beitrag zur Frage der Beziehungen zwischen Stoffwechsel und Harnfarbe. Ztschr. f. d. ges. exper. Med., 72:545-560, 1930.
Heilmeyer reports that he found the theory of Drabkin, that there is a definite relation between increased metabolism and urine coloring matter, to be incorrect.
I,1,2; (3).

401. Heilmeyer, L.
Spektrophotometrische Harnfarbmessungen bei Leberschädigung und gesteigerter Hämolyse. Verhandl. d. deutsch. Gesellsch. f. Inn. Med., 41:485-486, 1929.
A,f; I,1,2; (6).

402. Heilmeyer, L.
Zur spektralen Harnfarbanalyse mit dem M. Weisschen "Spektrometer." Deutsches Arch. f. klin. Med., 168:244-250, 1930.
Polemic against Weiss' spectrometer. Nothing new. The above spectrometer is only usable for well defined bands but not for broad washed-out bands.
H,a; I,1,2; (6).

403. Heilmeyer, L.
Die Harnfarbe und ihre Zusammensetzung. Klin. Wchnschr., 12:229-230, 1933.
Polemic against Weiss.
I,1,2; (6).

404. Heilmeyer, L. and Krebs, W.
Die quantitative Bestimmung des Urobilins und Urobilinogens mit dem Zeisschen Stufenphotometer. Biochem. Ztschr., 231:393-398, 1931.
An exact method for the determination of urobilin and urobilinogen given. Method uses Zeiss step-photometer.
A,c; F,b; I,1,2; (3).

405. Heilmeyer, L. and Otto, W.
Klinische Farbmessungen. IX. Die Analyse des Harnrestfarbstoffs; ein Beitrag zur Klärung der Urochromfrage. Ztschr. f. d. ges. exper. Med., 74:490-513, 1930.
There are two urochromes A and B as separated by ammonium sulphate. They can be differentiated by means of absorption spectra. But urochrome A has two different constituents, both very sensitive to O_2. The color of urochrome B is not oxygen-sensitive. Urochrome A is responsible for 26 - 42%, and B for 50 - 74% of total urochrome color.
F,b; I,1,2; (2).

406. Heiniö, P.
Bilirubinstudien an Kindern. Methode Kerppola-Leikola. Acta paediat., 14:453-473, 1933.
F,b; I,1,2; (6).

407. Herold, K. and Meissner, H.
Untersuchungen über den Urinfarbwert nach Röntgen und Radiumbestrahlungen. Beitrag zur Frage der Einwirkung der Erythrocyten. Strahlentherapie, 47:291-308, 1933.
After each irradiation a larger amount of coloring matter was secreted. The type of elimination was different for x-ray and radium treatment.
A,b; I,1,2, VI,2; (3).

408. Herzfeld, E.
Beiträge zur Methodik von quantitativen Bilirubinbestimmungen. Biochem. Ztschr., 251-394-403, 1932.
Description of chemical methods of bilirubin determination.
F,b; VII; (6).

409. Hohlweg, H.
Zur Kenntnis des Urochroms. I. Bioch. Ztschr., 13:199-204, 1908.
Experiments on the production of urochrome.
F,b; I,1, VII; (5).

410. Jolles, A.
Über eine neue Methode zur quantitativen Bestimmung des Indikans im Harne. Ztschr. f. physiol. Chem., 94:79-103, 1915.
I,1,2; (6).

411. Klemperer, G.
Die Messung des Harnfarbstoffs und ihre diagnostische Verwertbarkeit. Berl. klin. Wchuschr., 40:313-316, 1903.
Clinical importance.
I,1,2; (6).

412. Leikola, E.
Untersuchungen zum Nachweis des Harns mit besonderer Berücksichtigung der Spektrofotometrischen Methode. Acta soc. med. Fenn. Duodecim, 11, Heft 2, 1-93, 1929.
Color of urine of normal humans is constant. Absorption coefficients for different wave lengths given.
I,1,2; (3).

413. Leikola, E.
Eine neue Methode zur quantitativen Bestimmung des Urobilins im Harn. Acta soc. med. Fenn. Duodecim, 11, Heft 3, 1-14, 1929.
Explains a new method for determination of urobilin in urine. A typical deviation caused by urobilin in absorption curve of urine at wave-length 4900 Å.
F,b; I,1,2; (3).

414. Leikola, E. and Vartiainen, I.
Spektrophotometrische Untersuchungen über die Farbe des Harns bei verschiedenen Krankheiten. Acta soc. med. Fenn. Duodecim, 11:Heft 4, 1-20, 1929.
Determined absorption curve of urine in 100 diseased cases. Color of urine does not deviate in general from normal one.
I,1,2; (3).

415. Mann, F. C., Bollman, J. L., and Magath, T. B.
Studies on the physiology of the liver. IX. The formation of bile pigment after total removal of the liver. Amer. J. Physiol., 69:393-409, 1924.
Yellow pigment of urine also excreted after removal of liver. Formation of this pigment not dependent on intra-abdominal organs. Pigment gave all the tests for bilirubin. Good bibliography.
A,e,f; F,b; I,1,2; (3).

416. Nakadate, K.
Über Veränderungen der Ausscheidung von Zink durch Bestrahlung. Biochem. Ztschr., 265:61-63, 1933.
Rats were fed zinc acetate and irradiated with definite energy values of light from a quartz-mercury-vapor lamp, vitalux, mitra, and infra-red lamp. Long infra-red waves were filtered out. The effect of the light produced an increased secretion of the zinc.
I,4; (3).

417. Namba, M.
Über paroxysmale Uroerythrinurie. Deutsches Arch. f. klin. Med., 156:272-282, 1927.
Clinical importance.
F,b; I,1,2; (6).

418. Niederhoff, P. and Holland, G.
Über eine durch Fluorescenzlicht nachweisbare Substanz im menschlichen Harn. Klin. Wchnsshi., 12:1184, 1933.
Urine usually has a blue fluorescence in ultra-violet light; but in some cases it showed a brown-green tinge. If the blue-green material is absorbed on Fuller's earth, the rest gets back its blue fluorescence. This fluorescence shows especially in malaria but also occasionally in high fever and certain types of liver disease.
II,2; (2).

419. le Nobel, C.
Über die Einwirkung von Reduktionsmitteln auf Hämatin und das Vorkommen der Reduktionsprodukte in pathologischem Harne. Pflügers Arch. f. d. ges. Physiol., 40:501-523, 1887.
F,b; I,1,2; (6).

420. Oppler, B.
Die Bestimmung des Traubenzuckers in Harn und Blut. Ztschr. f. physiol. Chem., 75:71-134, 1911.
A,b; F,c; IV,1; (6).

421. Otto, W. and Heilmeyer, L.
Klinische Farbmessungen. X. Der Einfluss von Phenylhydrazingaben und Aderlässen auf den Blutfarbstoffwechsel mit besonderer Berücksichtigung der Harnfarbstoffausscheidung. Ztschr. f. d. ges. exper. Med., 77:144-172, 1931.
Importance of measurement of urine coloring matter by treatments with phenylhydrazine.
A,b; I,1,2; (6).

422. Pincussen, L.
Über die Beförderung der Ausscheidung von Blei durch Bestrahlung. Klin. Wchnschr., 12:275, 1933.
See detailed article in Biochem. Ztschr.
I,4; (3).

423. Probst, R.
Spektralanalytischer Nachweis von Wismut in Gewebe, quantitativer Nachweis von Quecksilber im Harn. Arch. f. exper. Path. u. Pharmakol., 169:119-129, 1933.
Spectral analysis of urine and tissue. Modified technic described. Tests made for bismuth and mercury. Found wherever bismuth is present copper can also be found.
A,f; II,1; (2).

424. Reinhard, M. C.
Ultra-violet absorption spectra of certain physiological fluids. J. Gen. Physiol., 11:1-6, 1927.
Absorption spectra given for: urine, uric acid, bile, saliva, serum albumine, euglovine, blood-serum and hemoglobin.
A,b,c,e; F,a,b; I,1,2; (2).

425. Rudert, H. and Heilmeyer, L.
Spektrophotometrische Studien über Urobilin. Biochem. Ztschr., 261:336-352, 1933.
See paper by Heilmeyer and Krebs.
I,1,2; (4).

426. Sachs, P.
Über die chemische Grundlage der Ehrlichschen Diazoreaktion im Harn. Ztschr. f. klin. Med., 119:381-402, 1932.
No absorption spectra taken. A crystallized dichlorazo-benzol was isolated from diazourine. It has the composition $C_{31}H_{24}O_6Cl_4O_7$ and is blue in NaOH solution. It can be found in tuberculosis, typhoid, lymphogranuloma, malaria, measles, sepsis, miliary tuberculosis, and in different carcinoma cases. The material is also often present in healthy people but in only small amounts.
VII; (6).

427. Scheff, G.
Über den aus normalem Menschenharn durch Behandlung mit p. Dimethylaminobenzaldehyd rein darstellbaren roten Farbstoff. Biochem. Ztschr., 158:167-169, 1925.
New method for production of crystallized, new colored product, produced from urine by Hari. Only chemical.
F,b; VII; (6).

428. Schenck, M.
Zur Kenntnis der Gallensäuren. IX. Ztschr., f. physiol. Chem., 128:53-58, 1923.
F,b; VII; (6).

429. Schreus, H. T. and Carrié C.
Weitere Mitteilung zur quantitativen Porphyrinbestimmung im Harn. Klin. Wchnschr., 12:146-148, 1933.
Method for determination of porphyrines given. Method more sensitive than the spectroscopic one but less so than fluorescence method.
F,b; H,a; I,1,2, II,2; (3)

430. Schumm, O.
Untersuchungen über den Nachweis von Blut im Harn mit Hilfe des spektroskopischen und einiger spektroskopisch-chemischer Verfahren. München. med. Wchnschr., 55:1488-1491, 1908.
Discussion of use of spectrographic method in determination of blood in urine.
A,b; I,1,2; (6).

431. Schumm, O.
Über das "Hämatoporphyrin" aus Harn und Knochen. Ztschr. f. physiol. Chem., 96:183-203, 1915.
Hematoporphyrin from urine and bones.
A,f; F,b; I,1,2; (3).

432. Siebert, W.W.
Die mitogenetische Strahlung des Blutes und des Harns gesunder und kranker Menschen. Biochem. Ztschr., 225:253-256, 1930.
Urine as well as blood of healthy persons emits mitogenetic rays. Urine and blood of people with malignant tumors, severe anemia, leukemia, people with high fever (sepsis, pneumonia, scarlet fever) do not emit mitogenetic rays.
A,b,f; G,e; II,5; (3).

433. Spirt, J.
Experimentelle Untersuchungen über den Einfluss des ultra-violetten Lichtes auf die Lage des Oxydationsquotienten im Harn. Biochem. Ztschr., 195:142-148, 1928.
Changes in oxidation quotient in urine of dog observed before and during irradiation with quartz lamp.
I,4; (6).

434. Stepp, W.
Über die Ausscheidung der Harnfarbstoffe, insbesondere des Urochroms, bei gewissen Nierenerkrankungen. München. med. Wchnschr., 65:560-563, 1918.
Calls attention to importance of urine pigment in kidney diseases.
I,1,2; (6).

435. Strauss, H. and Hahn, L.
Über Urobilinurie und Urobilinämie. Zentralbl. f. inn. Med., 41:193-198, 1920.
Urobilin as well as urobilinogen is a part of every normal urine, thus also of every serum.
A,c; F,b; I,1,2; (3).

436. Sturm, R.
Herzgrösse und Herzfunktion. Beitrag zur Stufenphotometrie des Harn von Herzgesunden, Hypertoniken, Herzfehlerkranken und muskulär Herzinsuffizienten. Deutsches Arch. f. klin. Med., 170:24, 1931.
Only clinical importance.
I,1,2; (3).

437. Terwen, A. J. L.
Über ein neues Verfahren zur quantitativen Urobilinbestimmung in Harn und Stuhl. Über die Bereitung und die Eigenschaften von einem möglichst reinen Urobilinpräparat. Deutsches Arch. f. klin. Med., 149:72-101, 1925.
Detailed discussion of "Terwen" method of urobilin determination. Important paper because Terwen's method is discussed in large number of articles. Good literature review.
A,e; F,b; I,1; (2).

438. Urbach, C.
Quantitative Bestimmung des Magnesiums im Harn mittels des Stufenphotometers. II. Biochem. Ztschr., 252:74-80, 1932.
Simple method for determination of magnesium in urine.
I,1; (6).

439. Urbach, C.
Beiträge zur stufenphotometrischen Mikroanalyse des Harnes und des Blutes. IX. Quantitative Bestimmung des Ammoniaks im Harn. Biochem. Ztschr., 259:351-357, 1933.
Method for determination of ammonia in urine with help of Pulfrich stepphotometer.
H,a; I,1,2; (3).

440. Veil, W. H.
Die Harnfarbe eine bedeutsame Funktion des Organismus. Klin. Wchnschr., 6:2217-2221, 1927.
Good, general, descriptive, introductory article for color of urine and serum.
F,b; I,1; (4).

441. Weiss, M.
Die Farbstoffanalyse des Harns. II. Das Urochromogen. Biochem. Ztschr., 112:61-97, 1920.
F,b; I,1,2; (3).

442. Weiss, M.
Die Farbstoffanalyse des Harns. IV. Die Diazoreaktionen des Harns und die Beurteilung der Urochromogenausscheidung. Biochem. Ztschr., 134:269-291, 1923.
Chemical detection of blood pigments.
F,b; I,2, VII; (3).

443. Weiss, M.
Die Farbstoffanalyse des Harns. V. Die Urochromogenausscheidung im gesunden und kranken Organismus. Biochem. Ztschr., 134:567-588, 1923.
Chromogen excretion in healthyand diseased people, detected by Chemical means.
I,2, VII; (3).

444. Weiss, M.
Die Farbstoffanalyse des Harns. VII. Urobilinbestimmung auf spektrophotometrischen Wege. Biochem. Ztschr., 207:151-158, 1929.
Method for determination of urobilin in urine, feces and bile. Method uses spectrometer of Weiss and comparison vessel with known solution of urobilin.
A,e; F,b; Ha; I,2; (3).

445. Weiss, M.
Die Harnfarbe und ihre spektrale Analyse. Deutsches Arch. f. klin. Med., 166:331-348, 1930.
Description of Weiss' spectrometer, also excellent illustrations showing absorption spectra of different urine and stool pigments. Table showing in mg. urobilin, uroerythrin*, bilirubin, koproporphyrin, urorubin*, urochromogen, indican, urorosein*, stool urobilin in urine of healthy people and following diseases, pneumonia, tuberculosis pulmonaris et intestini, diabetes senilis, cirrhosis hepatis, anaemia perniciosa, carcinoma ventri, secondary anemia, vit. cordis, decomp., icterus in liver carcinoma, rheumat. articul. febr.
Starred values given only for comparative purposes.
A,e,f; F,b; H,a; I,1,2; (2).

446. Weiss, M.
Die Harnfarbe und ihre Zusammensetzung. Klin. Wchnschr., 11:1817-1820, 1932.
Good review article for urine pigments.
F,b; I,1,2; (4).

447. Wiley, F. H., Owens, J. S., and Duffendack, O. S.
The quantitative spectrographic determination of inorganic bases in biological material. J. Biol. Chem., 100:CV-CVI, 1933.
Short abstract of a paper on determination of Na, K, Ca, and Mg in urine by a spectrographic method.
II,1; (3).

See also:

84, 85, 105, 117, 119, 143, 150, 165, 185, 203, 213, 247,
264, 282, 283, 296, 315, 322, 448, 452, 470, 471, 476, 600,
604, 671, 673, 694, 719, 754, 768, 801, 1032, 1043, 1052, 1258,

1303, 1358, 1373, 1390, 1399, 1401, 1406, 1410, 1416, 1417, 1418, 1419,
1421, 1422, 1423, 1424, 1425, 1427, 1459, 1462, 1472, 1491, 1500, 1502,
1503, 1504, 1508, 1514, 1530, 1531, 1545, 1552, 1553, 1554, 1607, 1625,

1629, 1639, 1650, 1697, 1700, 1711, 1712, 1713, 1714, 1735, 1742, 1743,
1748, 1750, 1791, 1805, 1806, 1868, 2119, 2694, 2752, 2774, 2868, 2968,
2970, 2972, 3236, 3246, 3261, 3300.

A. BODY FLUIDS AND TISSUES

e. Spinal fluids, bile, synovial fluid, etc.

448. Adler, A.
Eine neue Methode der exakt-quantitativen Urobilinogen-(Mesobilirubinogen)-Bestimmung in Harn und Stuhl. Deutsches Arch. f. klin. Med., 154:238-248, 1927.
Quantitative method for determination of urobilinogen in urine and feces, by which it is possible to determine unchanged pigment.
A,d; F,b; I,1; (6).

449. Bacq, Z. M. and Henri, V.
Preuve spectrographique de la formation de substances par excitation des nerfs cardiaques. Compt. rend. Acad. d. sc., 196:135-137, 1933.
The perfusion liquid of the heart absorbs in the ultra-violet only below λ 2700 Å. The perfusion liquid of a stimulated heart has a strong absorption band at λ 3400 Å. This is a band which is found in polyphenols. Authors conclude that this supports the opinion that the substances produced in the frog heart through the excitation of the vagosympathetic nerve go over into the perfusion liquid.
A,f; I,1,2; (2).

450. Bacq, Z. M., Henri, V, and Schepers, P.
Étude spectrographique des substances formées au cours de l'excitation des nerfs cardiaques. Compt. rend. Soc. de biol., 112:703-704, 1933.
The absorption spectra of the liquids formed in the frog heart before, during and after excitation. Absorption spectrum of the secreted liquid discussed in detail.
A,f; I,1,2; (2).

451. Bacq, Z.M., Henry, V. and Schepers, P.
Étude spectrographique des substances formées au cours de l'excitation des nerfs cardiaques; influence du pH. Compt. rend. Soc. de biol., 112:1214-1215, 1933.
The effect of pH on the recreation of the "substance" in the frog heart.
A,f; I,1,2; (3).

452. Bergh, A. A. H. van den
Der Gallenfarbstoff im Blute. pp112 Johann Ambrosius Barth, Leipzig. 1928. IInd Edition
New edition of v.d. Bergh's classical work on bile pigment in blood. Color reaction used for determination of bile pigment.
A,b,c,d; I,1,2, VII; (4).

453. Bergh, A. A. H. van den, and Muller, P.
Nachweis der Gallenfarbstoffe im Blute. Abderhalderis Handb. d. biol. Arbeitsmeth., Abt. IV, Teil 4. 2. Häfte, 1927. 901-920.
See v. d. Bergh's more extensive publications on same subject.
A,b; F,b; I,1,2; (4).

454. Berliner, M.
Untersuchungen über optisch wahrnehmbare Phänomene an Punktionsflüssigkeiten bei Carcinom- und anderen Krankheiten. Zugleich ein Beitrag zur Kenntnis der Gerinnungsvorgänge. Ztschr. f. Krebsforsch., 32:171-181, 1930.
Spinal fluid of 12 carcinoma cases in serum mixtures showed increased clouding effects.
A,f; III,1; (3).

455. Blumberg, H. and Rask, O. S.
The spectrographic analysis of milk ashes. J. Nutrition, 6:285-288, 1933.
Elements present in milk determined by emission spectral analysis.
II,1; (3).

456. Bollman, J. L. and Mann, F. C.
Liver and Bile. Ann. Rev. Biochem., 3:367-380, 1934.
Up-to-date review. Good literature list.
A,f; F,b; I,1,2; (4).

457. Brown, Mc. Master and Rous
Studies on the total bile. IV. The enterohepatic circulation of bile pigment. J. Exper. Med., 37:699-710, 1923.
F,b; I,1,2; (6).

458. Christiansen, W.
Das Menotoxinproblem und die mitogenetischen Strahlen. Ber. d. deutsch. bot. gesellsch., 47:357-370, 1929.
The toxic effect of menotoxin is demonstrated.
G,c; II,5; (6).

459. Christiansen, W.
Das Menotoxinproblem und die "mitogenetischen" Strahlen. Tagung deutsch. physiol. Gesellsch. in Kiel, May 22-24, 1929.
II,5: (6).

460. Condorelli, F.
L'azione fotodinamica della bile. Arch. di fisiol., 28:242-268, 1930.
Author concludes that bile has a photo-dynamic effect also on the living organism.
I,4,5; II,2; (6).

461. Damianovich, H., Williams, A. T., and Pirosky, I.
Spektroskopische Untersuchungen über die Absorption der Ultraviolettstrahlen durch den Liquor. (Spanish) An. del inst. Modelo clin. med., 10:248-251, 1927.
The cerebro spinal fluids of normal and diseased persons were tested for absorption in the ultra-violet. The absorption of fluids of healthy persons very constant; that of diseased persons shows large variation.
I,1,2; (2).

462. Gärtner, S. and Kostyál, L.
Weitere Studien über die Eigenschaften des mit ultravioletten, Sonnen und Röntgenstrahlen behandelten Liquors. Ztschr. f. d. ges. Neurol. u. Psychiat., 134:361-381, 1931.
Changes in absorption spectra of spinal fluid of healthy and diseased persons after irradiation with ultra-violet, sunlight and x-rays.
A,c; F,a; I,1,2,4; (3).

463. György, P. and Kuhn, R.
Über einen Farbstoff im liquor cerebrospinalis eines Kindes mit Meningitis tuberculosa. Naturwissensch., 130:405-406, 1932.
Absorption spectrum indicates presence of pigment similar to ovoflavin.
F,a; I,1,2; (3).

464. Hewitt, L. F.
Pigment obtained from faeces. Brit. J. Exper. Path., 8:333-335, 1927.
The preparation and probable constitution of a brilliant red pigment obtained from faeces. (Author's summary)
I,1,2; F,b; (3).

465. Hooper, C. W. and Whipple, G. H.
Bile pigment metabolism. I. Bile pigment output and diet studies. Am. J. Physiol., 40:332-348, 1916.
Bile pigment is necessary for the well-being of the animal. General physiological work.
VII; (6).

466. Jacobi, W.
Über spektrographische Untersuchungen des Liquor cerebrospinalis im ultravioletten Licht. Arch. f. Psychiat., 79:317-322, 1927.
Ultraviolet absorption spectra of small number of cerebrospinal fluids of persons with certain mental diseases.
I,1,2; (3).

467. Jacobi, W. and Winkler, H.
Untersuchungen des Liquor cerebrospinalis mit dem dem Zeissschen Spektrographen für Chemiker. Deutsche Ztschr. f. Nervenh., 111:5-18, 1929.
Absorption spectra for 68 cerebro spinal fluids of different diseases taken with Zeiss spectrograph for chemists Following diseases investigated: paralysis, schizophrenia, lues cerebri, lues congenita, meningitis epidemica, post-infectious weakness, multiple sclerosis, psychopathy, and Little's disease. Very interesting article. Definite differences in absorption spectra of spinal fluids in case of different diseases.
I,1,2; (2).

468. Jacobi, W. and Winkler, H.
Spektrophotographische Untersuchungen. Arch. f. Psychiat., 91:171-186, 1930.
Absorption spectra in ultra-violet for cerebro spinal fluids in 26 cases of oligophrenia, 10 schizophrenia, 8 progressive paralysis, one post infectious weakness condition and one meningitis epidemica. All fluids free from blood pigment; proteins not removed. Some changes in absorption noticed in certain cases.
I,1,2; (2).

469. Karczag, L. Hanák, M. and Szendey, L.
Spektrographische Studien an pathologischen Körperflüssigkeiten. Ztschr. f. klin. Med., 124:310-315, 1933.
Albumin components predominant in human blood serum absorption spectrum. Pleuritic exsudate cannot be distinguished in its absorption spectrum from native blood serum. Lymph has somewhat different absorption curve. In ascites liquid the albumin fraction is most pronounced. Absorption spectrum of oedema liquid shows predominance of globuline component.
A,b,c; F,a; I,1,2; (2).

470. Küster, W.
Beiträge zur Kenntnis der Gallenfarbstoffe. Über Bilirubin, Biliverdin und ihre Spaltungsprodukte. Ztschr. f. d. ges. physiol. Chem., 59:84-95, 1909.
A,c,d; F,b; I,1,2; (5).

471. Küster, W.
Beiträge zur Kenntnis der Gallenfarbstoffe. VIII. Über das Bilirubin. Ztschr. f. physiol. Chem., 94:136-171, 1915.
A,d; F,b; I,1,2; (5).

472. Leikola, E.
Milchuntersuchungen. I. Über die Lichtabsorption der Milch. Acta soc. med. fenn. duod. Ser. A, 14:1-7, 1930.
Milk absorbs more red than blue light.
I,1,2; (2).

473. Leikola, E.
Milchuntersuchungen. II. Steht die Trübungsstärke der Milch in bestimmtem Verhältnis zu deren Fettgehalt. Acta Soc. Med. fenn. duod. Ser. A., 14:1-10, 1930.
Lambert-Beer's law is followed. Light absorption of milk and its reflectory capacity are on the whole directly comparable with the fat contents of milk.
I,1,2; III,1; (3).

474. Lepehne, G.
Das Problem der Gallenfarbstoffbildung innerhalb und ausserhalb der Leber. Akad. Verlagsges. Leipzig, 1930. 90p.
A detailed discussion of the formation of bile pigment. 241 references.
F,b; I,1,2; (4).

475. Lindahl, C.
Über die Absorption ultravioletten Lichtes durch die Tränenflüssigkeit. Arch. f. Augenh., 75:263-299, 1913.
Thorough investigation of the absorption of watery secretion of the lacrimal glands down to λ 2400 Å.
I,1,2; (1).

476. MacMunn, C. A.
Observations on the colouring matters of the so-called bile of invertebrates, on those of the bile of vertebrates, and on some unusual urine pigments, etc. Proc. Roy. Soc. London B, 35:370-403, 1883.
Historical interest.
A,b,c,d; I,1,2,4; (5).

477. MacMunn, C. A.
On the origin of urohaematoporphyrin and of normal and pathological urobilin in the organism. J. Physiol., 10:71-121, 1889.
F,b; I,1,2; (5).

478. Mann, F. C.
The extrahepatic formation of bilirubin. Ergebn. d. Physiol., 24:379-398, 1925.
Review with 50 references.
I,1,2; VII; (4).

479. Mann, F. C. and Bollman, J. L.
The relation of the gall bladder to the development of jaundice following obstruction of the common bile duct. J. Lab. & Clin. Med., 10:540-543, 1925.
I,1,2; (6).

480. Mann, F. C., Bollman, J. L. and Sheard, C. H.
Studies on the physiology of the liver. XI. The extrahepatic formation of bilirubin. Amer. J. Physiol., 74:49-60, 1925.
Additional proof that pigment which develops in dehepatized animal is bilirubin and that extrahepatic formation of bile pigment is possible.
F,b; I,1,2; (3).

481. Martini, E.
Die Wirkung des Lichtes auf das Oxydations-Reduktionspotential der Milch. Biochem. Ztschr., 260:153-160, 1933.
Effect of light on redox potential of milk. Several interesting points brought out. Good bibliography.
I,4; (3).

482. Opitz, G.
Über spektrophotographische Untersuchungen von normalem und pathologischem liquor cerebrospinalis. Deutsches Ztschr. f. Nervenh., 94:266-279, 1926.
Absorption spectra taken for normal spinal fluid and fluid of people with following diseases: progressive paralysis, tabes, tumor cerebri, postencephalitic condition, meningitis purulenta, multiple sclerosis. A few interesting changes in absorption spectra of fluids of diseased people.
A,c; I,1,2; (2).

483. Pappendieck, A.
Über das Porphyrin der menschlichen Faeces. II. Ztschr. f. physiol. Chem., 133:97-99, 1924.
F,b; I,1,2; (3).

484. Reinle, H.
Über die Wirkung der Becquerel- und Röntgenstrahlen sowie des ultravioletten Lichtes auf die Peroxydase und Methylenblau-Formalin-Reduktase-Reaktion der Kuhmilch. Biochem. Ztschr., 115:1-21, 1921.
Qualitative work on effect of light from mercury vapor lamp on bovine milk. (73 references).
B; I,1,4; VI,2; (3).

485. Schumm, O.
Zur Frage nach dem Vorkommen von Blutfarbstoff oder Hämatin in menschlischer Galle. München. med. Wchnschr., 54:1580-1581, 1907
Clinical investigations of occurrence of blood pigment or haematin in human bile.
A,b,f; F,b; I,1,2; (5).

486. Schumm, O.
Ein Apparat zur Harnstoffbestimmung im Liquor cerebrospinalis. Ztschr. f. physiol. Chem., 96:335-341, 1916.
Apparatus for determination of urea in spinal fluid.
H,a; VII; (6).

487. Shinoya, T.
A study of the ultraviolet abosrption spectra of cerebrospinal fluid - a new test. Am. J. M. Sc., 167:735-747, 1924.
All pathological spinal fluids gave band at λ 2551-2941 Å.
I,1,2; (6).

488. Skinner, E. F.
Cerebrospinal fluid examined by ultra-violet light. J. Neurol. & Psychopath. 10:97-105, 1929.
Absorption spectra of cerebro spinal fluid in cases of tabes, paralyses, tuberculous meningitis. Some differences in spectra.
I,1,2; (3).

489. Skinner, E. F.
Further notes on examination of cerebrospinal fluid by ultraviolet light. J. Neurol. & Psychopath. 2:144-155, 1930.
In cases of meningitis of any type there appears to be certain selective absorption with interval between wavelengths 3051 and 2764 Å. Variation from this type depends on natural history of individual case.
I,1,2; (2).

490. Skursky, J.
Über den Einfluss des Ultraviolettlichtes auf die keimtötende Kraft entzündlicher Ergüsse. Wien. klin. Wchnschr., 1351-1352, 1929.
Certain discharges of breast, stomach, and joint cavities have bactericidal effect on anthrax bacilli. Effect increased if discharges are exposed to ultra-violet.
G,c; I,4; (3).

491. Smith, F. C.
The ultraviolet absorption spectra of cerebro-spinal fluids. J. Physiol., 62:25-26, 1927.
Short note.
I,1,2; (3).

492. Süllmann, H. and Schaub, L.
Die Bestimmung der Gallensäuren mit Hilfe des Stufenphotometers. Biochem. Ztschr., 251:369-383, 1932.
Use of Zeiss step-photometer in connection with Pettenkofer's reaction in determination of bile acid.
A,a; F,b; I,2; (3).

493. Terwen, A. J. L. and Liechtenstein, A.
Eine vergleichende Untersuchung der Bestimmungsverfahren für Urobilin in den Fäzes nach Charnas und nach Terwen. Deutsches Arch. f. klin. Med., 149:113-116, 1925. (Labor. der intern. Klin. der Univ. Amsterdam).
Charnas' method for urobilin determination gives values which are too low. Authors feel that values given by Terwen's method are more correct.
F,b; I,1; (6).

494. Veraguth, O. and Opitz, G.
Über spektrophotographische Untersuchungen des Liquor cerebrospinalis. Deutsche Ztschr. f. Nervenh. 84:114-117, 1925.
Authors believe there is some promise in following the absorption spectra of spinal fluid in certain diseases. Since only a few cases were investigated no definite statement can be made.
I,1,2; (2).

495. Wright, N. C. and Papish, J.
The inorganic constituents of milk. Science 69:78, 1929.
The metal constituents of dried milk and milk ashes were determined by emission specrography. Interesting results.
II,1; (2).

See also:

36, 62, 85, 118, 143, 185, 203, 242, 247, 252, 255, 283,
284, 322, 323, 331, 353, 375, 376, 382, 383, 415, 424, 437,
444, 445, 528, 598, 600, 631, 688, 694, 719, 752, 768, 1077,

1079, 1117, 1196, 1289, 1303, 1373, 1378, 1406, 1415, 1417, 1418, 1419,
1421, 1422, 1427, 1446, 1451, 1462, 1471, 1472, 1477, 1478, 1479, 1487,
1503, 1504, 1553, 1554, 1639, 1658, 1713, 1731, 1742, 1748, 1789, 2125,

2166, 2784, 2788, 3236, 3246, 3261, 3300.

A. BODY FLUIDS AND TISSUES

f. Body tissues including cancer

496. Allen, A.J., Franklin, R., and Macdonald, E.
Microphotography and some radiation effects on living organisms with various wave lengths of monochromatic ultraviolet light. Physical Rev., 43:1042, 1933.
Short note on study of effects of light shorter than λ 2900 Å on protozoa and cancer tissue.
G,f; I,1,4; (6).

497. Anderson, W.T. and Fraser, H.D.
The penetration of ultraviolet rays into live animal tissue. Brit. J. Phys. Therap., 6:170, 1931.
Further work on penetration of ultra-violet through the skin.
I,1,2,4; (3).

498. Anderson, W.T. and Macht, D.I.
The penetration of ultraviolet rays into live animal tissue. Am. J. Physiol., 86:320-330, 1928.
Previous paper of Macht, Anderson, and Bell not correct. Transmission for thickness of 1.2 mm. was found to be 6 to 10% for wave lengths λ 2537 Å to λ 3000 Å. See comment of Bachem and Reed on this paper.
I,1,2,4; (3).

499. Angus, T.C. and Taylor, H.T.
Measurements of transmission of radiation through a non-homogeneous medium, viz., the horny layer of the human skin. Proc. Roy. Soc., London, Series B, 109:309-318, 1932.
Method for measuring percentage transmission. Series of experiments which visible and ultra-violet radiations between λ 5790 Å and λ 2300 Å were used, pure monochromatic radiations being assured by use of double monochromators. (Authors' summary).
I,1,2,4; III,1; (3).

500. Anikin, A.W.
Das Nervensystem als Quelle mitogenetischer Strahlung. Arch. f. Entwcklngsmechn. d. Organ., 108:609-616, 1926.
General article on mitogenetic radiation of nerve systems.
II,5; (3).

501. Arzt, L. and Hausmann, W.
Zur Kenntnis der Hydroa. Strahlentherapie, 11:444-459, 1920.
Clinical importance. The photosensitizing action of porphyrines especially emphasized.
F,b; I,1,2,4,5; II,2; (3).

502. Bachem, A.
Ultra-violet transparency of various layers of human skin. Am. J. Physio. 91:58-64, 1929.
By setting a frozen section of skin crosswise before the slit of a quartz spectrograph and photographing the transmitted light interesting absorption spectra have been obtained. Lambert Beer's law does not hold accurately

since new factors are introduced through reflection, scattering and fluorescence. Different layers of the skin have different absorption in the ultra-violet. The antirachitic effect of ultra-violet is produced in the stratum corneum or granulosum and erythema originates in the stratum germinativum or corium.
A,b; C; I,1,2; III,1; (2).

503. Bachem, A.
Ultraviolet transparency of the various layers of human skin. Proc. Soc. Exper. Biol. & Med., 26:778-779, 1929.
See later paper for discussion.
I,1,2,4; (3).

504. Bachem, A.
Die Lichtdurchdringung der menschlicher Haut. Strahlentherapie, 39:30-56, 1931.
Summary of the work Bachem has done on the transmission of visible light through the skin.
I,1,2,4; II,2; III,1; (4).

505. Bachem, A. and Kunz, J.
The transmission of ultraviolet light through the human skin. Arch. Phys. Therapy, 10:50-59, 1929.
Good physical and biological set-up. Authors used highly purified spectrum and both photoelectric and photographic methods for registration of transmission. Light (ultra-violet) penetrates deeper into human skin than usually supposed but not as deep as Macht, Bell and Elvers claimed.
Absorption curves are given for: Cantharides blister, Pemphigus blister, Kromayer blister, Alpine blister, pigmented x-ray blister, exfoliative dermatitis, corn, horny layer (foot), epidermaphyton, blister serum, blood serum (clear), blood serum (discolored) and blood plasma, melanin, ear wax, lanolin, skin (white and colored), corium (white and colored), fascia (white and colored), subcutaneous layer, fat, muscle and blood.
Very complete paper if one excludes the work on serum and blood.
A,b,c; F,a,b; I,1,2; III,1; (1).

506. Bachem, A. and Reed, C.I.
The Penetration of Ultraviolet Light through the Human Skin. Speech before American Congress of Physical Therapy, Chicago, Nov. 4, 1929.
The disentangling of true absorption and scattering has been conducted through a few wave lengths. The spectrographic method does not give accurate quantitative results as to the light penetration into the tissue. The approximate distribution of the light through the various skin layers has been given for the most important parts of the spectrum (Author's Abstract).
I,1,2,4; III,1; (2).

507. Bachem, A. and Reed, C.I.
The transparency of live and dead animal tissue to ultraviolet light. Am. J. Physiol., 90:600-606, 1929.
Polemic against Macht. Authors show that there is very little difference between the transmission of living and dead skin to ultra-violet, at least when the latter is kept wet in Ringer solution and measured shortly after death. However, the dead skin even if wet will transmit less after a few hours. Authors found that the absorption coefficient changed with the wave length but that the scattering coefficient was independent of wave length.
I,1,2,4; II,2; III,1; (2).

508. Bachem, A. and Reed, C.I.
The penetration of light through human skin. Am. J. Physiol., 97:86-91, 1931.
See other papers for details.
I,1,2; (3).

509. Bachem, A. and Reed, C.I.
Skin and Radiation. Arch. Phys. Therapy, 12:581-590, 1931.
More work in the absorption spectra of the human skin.
I,1,2; (3).

510. Backer, P. de
Strahlenkunde IV. Über Strahlenhärte und Absorption durch unsere Gewebe Vlaamsch. geneesk. I 1:105-108, 1920.
The effects of α, γ, x-rays and light on the human skin are discussed.
I,4; VI,2; (6).

511. Baeyer, E. v.
Lichtdurchlässigkeit und Tätigkeitsstoffwechsel des Muskels. Klin. Wchnschr., 12:1278-1279, 1933.
The light absorption of muscles under different conditions changes very little. The change as related to the different chemical reactions taking place in the muscle is discussed.
I,4; III,1;

512. Barany, E.
Hemmung der autokatalytischen Gurwitsch-Strahling durch selektive Absorption. Naturwissensch., 1:573, 1931.
If growth of cancer is conditioned by autocatalysis it should be possible by injection of a pigment which absorbs in the region of the mitogenetic radiation to stop growth of cancer.
II,5; (6).

513. Becker, J. and Gaertner, O.
Untersuchungen zur Aufklärung der Empfindlichkeitsdifferenzen der Haut von Neugeborenen und Erwachsenen gegenüber Ultraviolettbestrahlung. Strahlentherapie, 48:250-266, 1933.
Surface layer of 0.1 mm. thickness of newborn child transmits very much less ultra-violet than skin of adult. Absorption is much higher in next layer of 0.05 mm.
I,1,2; (3).

514. Benoit, W.
Über spektrographische Untersuchungen an Gewebsschnitten menschlicher Organe unter Verwendung des Hochfrequenzfunkens nach Gerlach-Schweitzer. Ztschr. f. d. ges. exper. Med., 90:421-464, 1933.
Detailed discussion of Gerlach's method of spectral-analysis. Presence of following elements, cadmium, zinc, phosphorus, magnesium, sodium, iron, potassium, calcium, and copper in a large number of organs investigated.
II,1; (2).

515. Bernhard, F.
Die Lichtdurchlässigkeit der menschlichen Haut und ihre Beziehung zur Absorption des Lichtes. München. med. Wchnschr., 71:427-428, 1924.
Light is absorbed mostly for wave lengths around 3000 Å. Skin has highest transmission for light around 6000 Å.
I,1,2; (6)

516. Bertocchi, A.
Del potere di penetrazione globale dei raggi solari d'alta montagna attraverso i tessuti dell'uomo. Arch. di fisiol., 27:215-228, 1929.
Penetration of sun-heat radiation into skin.
I,1,4; (3).

517. Bodansky, M.
The zinc and copper content of the human brain. J. Biol. Chem., 48:361-364, 1921.
II,1; (6)

518. Bödecker, C.F.
Enamel of the teeth decalcified by the celloidin decalcifying method and examined with ultraviolet light. Dental Rev., 3:317-337, 1906.
Interesting work using ultra-violet microscope for examination.
I,1,2; (3).

519. Boyd, T.C. and De, N.K.
Some applications of the spectroscope in medical research. Ind. J. M. Research, 20:789-800, 1933.
Emission spectroanalysis of body organs and large number of Indian foodstuffs.
II,1; (3).

520. Boyd, T.C. and De, N.K.
Some applications of the spectroscope in medical research. Ind. J. M. Research, 21:109-113, 1933.
Presence of following metals determined qualitatively: manganese, zinc, aluminum, lead, copper, rubidium, silver, tin, cobalt, nickel, strontium, vanadium, beryllium, iron, caesium.
Following human tissues investigated: pancreas, brain, spleen, kidney, liver, heart, muscle. Also these plant-tissues tested: bengal, rice, nangoon rice, wheat, atta musuri dhal, mug dhal, arrhar dhal, beuli dhal, potato binjal, lady's finger, puin shak, palong shak. All these tested after being ashed in silica or platinum.
E,b; II,1; (4).

521. Bragg, W.
The crystals of the living body. Proc. Roy. Inst., Great Britain, 27: 606-624, 1933.
Very good discussion of x-ray analysis of body parts. Article contains many interesting suggestions for further work.
VI, 1; (1), (4).

522. Braul, J.
Über einige Ursachen der atypischen Mitosen in Zusammenhang mit der Lehre von den mitogenetischen Strahlen. Vopr, Ontol., 3:21-22, 1930.
Polemic against Gurwitsch on atypical mitoses in cancer tissues.
II,5; (6).

523. Brauner, R. and Soru, E.
Variations, en fonction du temps, de l'effet mitogénétique produit par le Bacillus tumefaciens sur la moelle osseuse du lapin. Compt. rend. Soc. de biol., 112:1122-1124, 1933.
If marrow of bones is exposed to radiation of B. tumefaciens and time of exposure varied, increase of mitoses of marrow will show several maxima. Verifying work of other investigators who found "wavelike" mitogenetic radiation effect.
II,5; (3).

524. Brauner, R. and Soru, E.
Action à distance des réactions oxydantes sur la moelle osseuse du lapin. Apparition de caryocinèses atypiques. Compt. rend. Soc. de biol., 114:297-299, 1933.
Mitogenetic radiation effect of mixtures of sugar and potassium permanganate on number of mitotic cells in bone marrow recognized.
F,c; II,5; (2).

525. Bromley, N.
Resorptionsprozesse als Quelle der Formbildung. VI. Der Einfluss der primären Verheilung der Wunde auf die Entstehung mitogenetischer Ausstrahlungen in ihr. Arch. f. Entwcklngsmechn. d. Organ., 123:274-278, 1930.
G,g; II,5; (3).

526. Brunsting, L.A. and Sheard, C.
The color of the skin as analyzed by spectrophotometric methods. II. The rôle of pigmentation. J. Clin. Investigation, 7:572-592, 1929.
I,1,2; (3).

527. Brunsting, L.A. and Sheard, C.
The color of the skin as analyzed by spectrophotometric methods. III. The rôle of superficial blood. J. Clin. Investigation, 7:593-613, 1929.
I,1,2; (3).

528. Burge, W.E.
The effect of radiant energy on the lens and the humors of the eye. Am. J. Physiol., 36:21-36, 1915.
Radiation from quartz-mercury lamp which is sufficiently intense to coagulate egg albumin, egg globulin, vitellin, serum albumin and serum globulin in 1 hour does not coagulate protein of normal lens even after 100 hours. Region of ultra-violet most effective lies between λ 2650 Å and λ3020 Å. Most effective is λ 2650 Å. In diabetes the accumulation of the sugar in the body fluids so modifies the lens protein that short waves of the spectrum can produce opacity. Since substances modify the proteins so that ultra-violet can penetrate, they decrease fluorescence of the lens. Infra-red and visible rays have no effect if all heat radiation is excluded.
A,e; F,a,b; I,1,2; II,2; (2).

529. Busck, G.
Beitrag zu den Untersuchungen über die Durchstrahlungsmöglichkeit des Körpers. Mitt. Fins. med. Lysinst., 4-8, 29-36, 1903.
Very qualitative work on penetration of human skin by light.
I,1; (5).

530. Butts, D.C.A., Hoff, T.E., and Palmer, F., Jr.,
A preliminary report on the study of the emission spectra and surface tension alterations in experimental animal tumors. Science, 65:304-306, 1927.
Neoplastic tissues showed more intense sodium lines than healthy tissues. Only preliminary report.
II,1; (3).

531. Cabanes, J.B.
Quelques indications particulières des rayons ultra-violets. Pp. 63. Bourdeaux, 1931-1932, Thèse, No. 117.
I,4; (6)

532. Cartwright, C.H.
Infra-red transmission of the flesh. J. Optic. Soc. America, 20:81-84, 1930.
Spectral energy of a light, transmitted through the cheek, tested photographically in region of $\lambda 0.86\mu$ and also by a spectrometer throughout the whole spectrum. Photographs of the spectrum showed 14% transmissions at $\lambda 0.86\mu$ through the cheek. The cheek transmitted a maximum of 20 per cent at $\lambda 1.15\mu$ and the water of the body cut off the longer wave lengths. The spectral energy transmitted by bacon fat was found to be similar to that of the cheek; however, it transmitted nearly five times as much energy.
I,1,2; (2).

533. Cernovodeanu, P. and Nègre
Action des rayons ultra-violets sur les tumeurs. Compt. rend. soc. de biol., 66:212-213, 1909.
Effects of a mercury lamp on certain tumors.
I,4; (6).

534. Chalupecky, H.
Der Einfluss der ultravioletten Strahlung auf die Augenlinse. Wien. med. Wchnschr., 63:1901-1906, 1986-1991, 1913.
Effect of ultra-violet light on the protein of the eye lense is studied.
F,a; I,4; (3).

535. Charpentier, A. and Meyer, E.
Recherches sur l'émission de rayons N dans certains phénomènes d'inhibition. Compt. rend. Acad. d. sc., 138:520-521, 1909.
II,5; (5).

536. Christiansen, Hevesy, and Lomholt
Recherches, par une méthode radiochimique, sur la circulation du plomb dans l'organisme. Compt. rend. Acad. d. sc., 179:291-293, 1924.
Interesting method (radio-chemical) of lead determination in body parts given. Somewhat outside the survey.
II,1; VI,2; VII; (6).

537. Clark, J.H.
The physiological action of light. Physiol. Rev., 2:277-309, 1922.
I,4; (4).

538. Clark, J.H., Hill, C. McD., Handy, M., Chapman, J., and Donahue, D.D.
Ultraviolet radiation and resistance of infection. IIe Cong. internat. Lum. Coph., 458-463, 1932.
There is no evidence that the resistance of rats to intraperitoneal injection of pneumococcus type I can be increased by ultra-violet radiation, or that the resistance of rabbits to intranasal inoculation with respiratory organisms can be increased by radiation. However, there is some evidence that chickens may be more resistant to a respiratory infection, given intranasally, after ultra-violet radiation.
G,c; I,4; (6).

539. Coblentz, W.W.
Spectral erythemic reaction of the untanned human skin to ultra-violet radiation. Tech. News Bull. Bur. of Stan., No. 201 -3-4, 1934.
See later paper for discussion.
I,4; (6)

540. Coblentz, W.W. Stair, R., Hogue, J.M.
The spectral erythemic reaction of the untanned human skin to ultra-violet rediation. Bur. of Stan. J. Res., 8:541-547, 1932, R.P. 433.
Spectral erythemic reaction of the untanned human skin to monochromatic ultra-violet light determined.
I,2,4; (6)

541. de Coulon, A.
Action des différentes radiations du spectre visible sur les tumeurs greffées de la souris et sur les tumeurs de goudron. Influence de la lumière solaire sur la fréquence d'apparition des tumeurs spontanées dans les élévages de souris. Arch. de physique biol., 3:223-238, 1921-1924.
Author believes there is a relation between malignant tumor appearance and light. Number of experiments with filtered light described.
I,4; (3).

542. Cramer, H. and Fechner, G.
Hautuntersuchungen und klinische Ergebnisse bei Anwendung von kaltem sichtbaren Rotlicht. Strahlentherapie, 39:474-484, 1932.
General clinical interest only.
I,4; (6).

543. Creuzberg, G., Dannmeyer, F., Hartleb, O. Lederer, E.L., Noël, L. v., Schubert, J., Seel, H., and Treplin, L.
Studien am Blute Karzinomatöser. Strahlentherapie, 42:609-709, 1931.
This co-operative study on the blood of carcinoma patients is a scheme which brought biologists and physicists together in such a way that co-operation was apparently obtained. The subtitles of the above review are given below. As far as this work is of direct apparent importance to this survey, it is discussed under authors:
2. Dannmeyer, F. and Seel, H. Physikalisch-biologische Gesichtspunckte über das Krebsproblem.
3. Noël, L. v. Chemische Feststellungen am Serum Karzinomatöser. Die Krebszahl und weitere charakteristische Daten zur Krebsdiagnose.
4. Dannmeyer, F., Hartleb, O., Schubert, J. Spektrometrische Untersuchun ungen am Blutserum Karzinomatöser. Die Krebskurve.
5. Lederer, E.L. Kolloidchemische Voruntersuchungen an Seren, besonders Karzinomatöser. Die Schutzzahl.
6. Creuzberg, G. and Seel, H. Tierexperimentelle Untersuchungen.
7. Treplin, L. Klinische Bemerkungen zu den Blutuntersuchungen Karzinomkranker.
8. Schlusswort.
I,1,2; VII; (4).

544. Creuzberg, G. and Seel, H.
Tierexperimentelle Untersuchungen. Strahlentherapie, 42:684-704, 1931.
Part I describes effect of blood and tissue extracts on tumors. Part II describes effects of several physical and chemical factors on growth of tumors. Ultra-violet light is included but results are not reported.
I,4; (6)

545. Cuzin, J.
Étude sur la nature des radiations actives dans les phénomènes de photosensibilisation, action photosensibilisatrice du bleu de méthylène, de l'éosine, de l'hématoporphyrine, sur le coeur de grenouille "in situ". Bull. Soc. chim. biol., Paris, 12:745-753, 1930.
Single wave lengths are, under certain circumstances, more effective than the total spectrum in the photodynamic action of certain dyes. Author concludes there must be antagonistic effects of different wave lengths if the entire spectrum is used. (Ber. d. Ges. Physiol.)
I,4,5; II,2; (3).

546. Danforth, R.S.
The penetration of living tissues by ordinary radiant energy. Proc. Soc. Exper. Biol. and Med., 27:283-285, 1930.
Living tissue is penetrated by light of λ 0.6 to 1.6μ. Maximum penetration seems to occur at a wave length of 1.15μ.
I,1,2; (2).

547. Dorno, C.
Physikalische Grundlagen der Sonnen- und Lichttherapie. Handb. d. ges. Strahlenheilk., 1:110-138, 1928.
Review of sunlight and artificial light therapy by one of its most outstanding authorities.
I,4; (6).

548. Policard, A., Dufourt, A., Anstett, P., and Petey
Localisation de l'or dans l'organisme au cours de la chrysothérapie. Son étude par l'histo-spectrographie. Lyon méd., 152:42-44, 1933.
It is possible to detect down to 10^{-8} to 10^{-9} grams of gold in a piece of tissue by Policard's method.
II,1; (3).

549. Dustin, A.P.
Les radiations à faibles doses ont-elles des propriétés excitatrices de la division cellulaire? Cancer, 7:257-273, 1930.
X-rays, if given in very small doses, may for a time give some stimulation. Since this work is somewhat outside our survey it will not be discussed here, but is quoted only on account of its significance for "stimulation."
A,g; VI,2; (2).

550. Dustin, A.P.
Les radiations à faibles doses ont-elles des propriétés excitatrices de la division cellulaire? Bull. Soc. franç de dermat. et. syph., 39:929-946, 1932.
VI,2; (6).

551. Dutoit, P., and Zbinden, C.
Analyse spectrographique des cendres de sang et d'organes. Compt. rend. Acad. d. sc., 188:1628-1629, 1929.
A preliminary report on spectral analysis (arc spectra) of blood, organs and tumors. Blood always contains: Ag, Al, Ca, Cu, Fe, K, Mg, Mn, Na, P, Si, Ti, Zn, and sometimes Co, Cr, Ge, Pb, Ni, and Sn are found. An electrolytic method used to concentrate some of the metals. Certain organs appear to concentrate certain metals. No quantitative data given.
A,b; II,1; (2).

552. Dutoit, P. and Zbinden, C.
Analyse spectrographique des cendres d'organes. Compt. rend. Acad. d. sc., 190:172-173, 1930.
Presence of following metals in human organs investigated by a spectrographic method, just roughly quantitative: silver, aluminum, cobalt, nickel, chromium, lead, tin, titanium, zinc. Method used not discussed here.
II,1; (4).

553. Eidinow, A.
Ultraviolet irradiation and experimental tumors. Acta radiol. (Stockh.) 14:408-418, 1933.
Jensen rat sarcoma behaves under the effects of the quartz-mercury-vapor lamp similar to bacteria, i.e., it is most sensitive to light shorter than λ2800 Å. The sensitivity seems to be the same as that of bacteria and protozoa. It has not been possible to show immunity in rats which had been inoculated with sarcoma suspensions inactivated by ultra-violet light. Animals irradiated after inoculation show accelerated growth probably on account of increased blood supply. (See work of Gates.)
G,c,f; I,4; (3)

554. Ellinger, F.
Weitere Untersuchungen über die Entstehung des Lichterythems. Arch. f. exper. Path. u. Pharmakol., 149:343-347, 1930.
F,a; I,1,4; (6)

555. Ellinger, F.
Die Ätiologie des Lichterythems vom Standpunkt des Latenzstadiums aus betrachtet. Strahlentherapie, 40:760-764, 1931.
Speculations about the process of erythema-formation.
I,1,4; (6).

556. Forsythe, W.E. and Christison, F.L.
Ultraviolet radiation from the sun and heated Tungsten. J. Optic. Soc. America, 20:396-410, 1930.
In discussing the efficiency of light from a Tungsten filament lamp, ultra-violet sun emissions at different locations given.
I,4; (6).

557. Forsythe, W.E. and Christison, F.L.
The absorption of radiation from different sources by water and by body tissue. J. Optic. Soc. America, 20:693-700, 1930.
The absorption of light especially for the near infra-red.
A,a; I,1,2; (2).

558. Fowler, E.P. Jr., and Applebaum, E.
Bone studies in ultraviolet light. I. Anat. Rec., 55:23-39, 1932.
Authors state: "It has been found possible to differentiate the various types of bone according to their fiber structure as demonstrated by ultraviolet microphotography."
I,1,2; (3).

559. Fox, H.M. and Ramage, H.
Spectrographic analysis of tissues. Nature, 126: 682,1930.
Interesting investigation using "the burning of a filter paper wrapped sample before a spectrograph" method for the detection of the following metals in a few human cases, but mostly in a number of invertebrates: iron, copper, manganese, nickel, cobalt, lead, silver, cadmium, lithium, strontium, and calcium fluoride.
G,g; II,1; (2).

560. Frank, G. and Popoff, M.
Die mitogenetische Strahlung des Muskels und ihre Verwertung zur Analyse der Muskelkontraktion. Arch. f. d. ges. Physiol., 223:301-328, 1929.
The mitogenetic radiation of a muscle discussed in detail.
II,5; (2).

561. Frank, G. and Rodionow, S.
Über den physikalischen Nachweis mitogenetischer Strahlung und die Intensität der Muskelstrahlung. Naturwissensch., 19:659, 1931.
The results of Frank and Rodionow on a Geiger counter discussed.
II,5; (3).

562. Frank, G. and Rodionow, S.
Physikalische Untersuchung mitogenetischer Strahlung der Muskeln und einiger Oxydations modelle. Biochem. Ztschr., 249:323-343, 1932.
This extensive paper gives description of results of Joffé's laboratory on the mitogenetic ray problem, using a physical detector.
A,b; F,c; II,5; (2).

563. Frankenburger, W. and Zimmermann, W.
Photochemische Betrachtungen zur Wirkung ultravioletter Strahlung auf die menschliche Haut. Naturwissensch., 21:116-125, 1933.
Interesting review about possible photochemical reactions producing erythema. Absorption spectra for human skin, histidin, histamin, and tyrosine given.
F,a; I,1,2,4; (2), (4).

564. Freund, L.
Beitrag zur Physiologie der Epidermis mit Bezug auf deren Durchlässigkeit für Licht. Arch. f. Dermat. u. Syph., 58:1-14, 1901.
Historical interest only.
I,1,2; (5).

565. Gaertner, O.
Die Durchlässigkeit der menschlichen Haut im Gebiete von 0.3-2.0μ. Strahlentherapie, 40:377-382, 1931.
Human skin transmits highly light from λ1.5 to 0.7μ, almost independent of wave length. Above λ1.5μ absorption increases rapidly. (See Bachem).
I,1,2; (3).

566. Gaul, L.E. and Stand, A.H.
Clinical spectroscopy. A study of biopsy material taken from patients receiving gold sodium thiosulphate. Arch. Dermat. & Syph., 28:790-794, 1933.
Gold in tissues detected by spectrographic methods.
II,1; (6).

567. Gerlach, W. and Ruthardt, K.
Der Elementnachweis im Gewebe. IX. Die quantitative spektralanalytische Bestimmung von Mangan im Gewebe. Virchows Arch. f. path. Anat., 292:52-54, 1934.
Manganese detected in tissues down to 0.1γ. Spectrographic method checked with chemical method with fairly good results.
II,1; (3).

568. Gerlach, Wa.
Aufgaben der quantitativen chemischen Spektralanalyse. Naturwissensch., 19:25-28, 1931.
Interesting review of Gerlach's work on emission spectroscopy.
II,1; (4).

569. Gerlach, Wa.
Die Deutung des Aschebildes in der Pathologie. Verhandl. d. deutsch. path. gesellsch., 26:163-174, 1931.
Interesting lecture of Walter Gerlach; discussion of many prominent physiologists.
II,1; (2).

570. Gerlach, Wa., and Gerlach, We.
Bleinachweis im organischen Gewebe. Naturwissensch., 19:111, 1931.
Detection of lead in extremely small pieces of tissue.
II,1; (3).

571. Gerlach, Wa., and Gerlach, We.
Der Elementnachweis im Gewebe. II. Der Gold- und Silbernachweis im Gewebe. Virchows Arch. f. path. Anat., 282:209-213, 1931.
Gold can be detected in quantities of less than 0.01 γ.
II,1; (2).

572. Gerlach, Wa. and Gerlach, We.
Der Elementnachweis im Gewebe. III. Mitt. zur Frage der Argyrosen, insbesondere über den spektrographischen Silbernachweis in der Haut. Dermat. Wchnschr., 95:1497-1508, 1932.
Interesting description of method of obtaining spectra. Very clear and detailed. On basis of few cases of poisoning it is shown that it is possible to detect silver in all kinds of tissue. Large quantities of tissue available, therefore, method not too difficult.
H,a; II,1; (2).

573. Gerlach, Wa. and Gerlach, We.
Der Elementnachweis im Gewebe. V. Der Thoriumnachweis im Gewebe. Virchows Arch. f. path. Anat., 287:135-138, 1932.
Detection of thorium with help of λ2835 Å line, especially in kidney tumor.
II,1; (3).

574. Gerlach, We.
Die Staublunge des Mansfelder Bergmanns, zugleich ein Beitrag zur Frage Staublunge und Lungentuberkulose. Arch. f. Gewerbe path. u. Gewerbehyg., 2:105-122, 1931.
II,1; (3).

575. Gerlach, We., and Gauder, G.
Über akute Staublungen zugleich ein Beitrag zur Frage Staublunge und Lungentuberkulose. Arch. f. Gewerbepath. u. Gewerbehyg., 3:44-57, 1932.
II,1; (3).

576. Gerlach, We., and Gerlach, Wa.
Der Elementnachweis im Gewebe. I. Mitt. Der exakte Bleinachweis im Gewebe. Arch. f. Gewerbepath. u. Gewerbehyg., 2:7-10, 1931.
Special attention paid to test for lead in edge of gums.
II,1; (2).

577. Gerlach, We., Ruthardt, K., and Prüsener, L.
Der Elementnachweis im Gewebe. VII. Mitt. Die quantitative Bestimmung von Gold in Geweben mittels Spektralanalyse, nebst histochemischen Vergleichsuntersuchungen. Beitz. s. path. Anat. u. z. allg. Path., 234: 617-642, 1933.
Extensive investigation of gold in tissue, especially after treatment with medicaments containing gold.
II,1; (2).

578. Gigon, A.
Organdifferenzierung mit infrarot Strahlen. Verhandl. d. deutch. Gesellsch. f. inn. Med., 41:160-167, 1929.
General absorption for infra-red rays of many human organs.
I,1; (6).

579. Gigon, A. and Boulenaz, R.
Licht und Kohlenhydratstoffwechsel. Schweiz. med. Wchnschr., 11:1228-1229, 1928.
Interesting photographs of tissues in red and infra-red light.
I,1,2; (6).

580. Glitscher, K.
Die Absorption des sichtbaren Lichtes in der Haut. Strahlentherapie, 9:255-260, 1919.
Skin of pig's bladder investigated for transmission in visible and near ultra-violet. Data obtained fit well with Hasselbach's.
I,1,2,4; (3).

581. Gottschalk, A. and Nonnenbruch, W.
Die Wirkung von Strahlenenergie auf die Gewebsatmung tierischer Zellen. Strahlentherapie, 15:98-102, 1923.
Short irradiation with mercury-vapor lamp causes slight increase in respiration of surviving frog muscles. Increased irradiation decreases respiration rate.
I,4; (3).

582. Grüneberg, T. and Säuferlin, H.
Die Beeinflussung der epicutanen Tuberkulinreaktion durch Ultraviolett-bestrahlung. Klin. Wchnschr., 12:949-951, 1933.
Ultra-violet irradiation increases tendency for specific epidermal sensibilisation for tuberculin.
G,b; I,4; (3).

583. Grynkraut, B.
De la fluorescence des substances cancérigènes. Néoplasmes, 12:5-13, 1933.
General review of stimulative action of light and x-rays and possible radiation from cancer tissue. Mention made of Gurwitsch's work.
I,4; II,2,5; VI,2; (4).

584. Gualdi, A.
Accelerazione del ricambio basale per azione di corpi fluorescenti in organismi esposti alla luca diffusa. Riv. di. pat. sper., 6:253-258, 1931.
Increase of metabolism of animals treated with fluorescing materials.
I,4,5; II,2; (6).

585. Gurwitsch, A.
Sur le rayonnement mitogénétique des tissus animaux. Comptr. ren. Soc. de biol., 11:87-88, 1924.
Several animal tissues as mitogenetic radiation senders discussed. Onion roots used as detectors.
E,b; II,5; (5).

586. Gurwitsch, A.
Die mitogenetische Strahlung des markhaltigen Nerven. Pflüger's Arch. f. d. ges. Physiol., 231:234-237, 1932.
Secondary mitogenetic radiation of nerves can be caused by other mitogenetic senders.
II,5; (3).

587. Gurwitsch, A.
Einige Bemerkungen zum Aufsatze "On the Gurwitsch-radiation of the eye." Acta Brevia Neerlandica, 3:127-128, 1933.
Cornea is good source of mitogenetic radiation.
II,5; (3).

588. Gurwitsch, A.
Excitants de la division cellulaire. Cong. Internat. de Lutte Scient. et Soc. contre le Cancer, Madrid, 3-13, 1933.
Review of sources of mitogenetic radiation. Unique position of cancer cells.
II,5; (4).

589. Gurwitsch, A.
Mitogenetic radiation of nerve. Nature, 131:512-513, 1933.
Polemic against A.V. Hill.
II,5; (3).

590. Gurwitsch, A. and L.
Die mitogenetische Strahlung des Carcinoms. II. Ztschr. f. Krebsforsch., 29:220-233, 1927.
Anatomical investigation of mitogenetic radiation of cancer tissue. Gurwitsch believes that because cancer tissue is strongly glycolyzed and because it goes easily into necrosis, it is a good mitogenetic sender.
G,e; II,5; (3).

591. Gurwitsch, A. and L.
Die mitogenetisch Strahlung und die Autokatalyse der Krebszelle. Ztschr. f. Krebsforsch., 36:319-341, 1932.
"There exists a kind of mutocatalysis of metabolism and radiation of the cancer cell."
II,5; (2).

592. Gurwitsch, A., Gurwitsch, L. Frank, G., Salkind S., Amkin, A. Dokutschaewa, W., and Sernowa, M.
Über ultraviolette Chemoluminescenz der Zellen im Zusammenhang mit dem Problem des Carcinoms. Biochem. Ztschr., 196:257-275, 1928
Onion root and blood called radiation sources of first kind. Under conditions which can be produced experimentally, or pathological conditions, radiations of second kind appear. Blood of starving rats stops radiating and only then does radiation of cornealepithelium begin. Radiation of cornea of winter frogs can be activated by ultra-violet. (Ztrl. ges. Radiol.)
II,5; (4).

593. Gurwitsch, A. and L., and Kisliak-Statkewitsch, M.
Sur le rayonnement mitogénétique du cancer. Compt. rend. Soc. de biol., 100:1080-1083, 1929.
Mitogenetic radiation of cancer tissue discussed.
G,e; II,2; (3).

594. Gurwitsch, A.
Die mitogenetische Strahlung der optischen Bahn bei adäquater Erregung. Pflüger's Arch. f. d. ges. Physiol., 231:255-264, 1932.
If light falls on frog's eye, mitogenetic radiation from nerve, or Tractor opticus, and from lobi optici can be recognized.
II,5; (3).

595. Gurwitsch, L.
Die mitogenetische Spektralanalyse. II. Mitteilung: Die mitogenetischen Spektren des Carcinoms und des Cornealepithels. Biochem. Ztschr., 236-425-431, 1931.
Mitogenetic ray spectrum of carcinoma consists of glycolysis and proteolysis components. Spectrum of corneal epithelium of rabbit has glycolytic origin.
II,5; (2).

596. Gurwitsch, L.
Le spectre mitogénétique des fibres proprioceptives du nerf. Ann. de physiol., 10:141, 1934.
Special nerve spectra given.
II,5;

597. Gurwitsch, L. and Anikin, A.
Das Cornealepithel als Detektor und Sender mitogenetischer Strahlung. Arch. f. Entwcklngsmechn. d. Organ., 113:731-739, 1928.
Corneal epithelium can be used as sender and detector of mitogenetic radiation.
A,b; II,5; (2).

598. Guthmann, H. and Weichsel, M.
Die Ultraviolettempfindlichkeit der Vagina und ihr Absorptionsspektrum. Strahlentherapie, 31:527-545, 1929.
In human beings mucus of vagina can stand higher doses of ultra-violet than ordinary skin. Cervix less sensitive than mucus of vagina. Dependence of this sensitivity upon menstrual phase noticed. Rays of λ 4000 Å to λ 3000 Å seem to penetrate deeper than waves of short lengths. After tissues dry absorption is observed around λ 4100 Å. (Biol. Abstr.)
A,e; I,1,2,4; (2).

599. Hallauer, O.
Über die Absorption von kurzwelligem Licht durch die menschliche Linse. Klin. Monatsbl. f. Augenheilk., 47:721-730, 1909.
Thorough work on absorption spectra of human lens for ultra-violet light depending on age, health, etc.
I,1,2; (1).

600. Hamperl, H.
Die Fluorescenzmikroskopie menschlicher Gewebe. Arch. f. path. Anat., 292:1-51, 1934.
Detailed discussion of technique and study of fluorescence of many body fluids and organs. Article has a very large reference list and is one of the most complete on this subject.
A,b,c,d,e; I,1,5; II,2; (2), (4).

601. Harders, W.
On the "Gurwitsch-radiation" of the eye. Acta Brevia Neerlandica, 3:1-4, 1933.
Author states: The human eye emits Gurwitsch rays. In cases of normal eyes these rays are about equally powerful. The cornea radiates little or not at all; the radiation issued from the conjunctiva and sclerae. The radiation of the eye is presumably a blood radiation; in the case of dilated conjunctival or scleral vessels, the radiation is more powerful.
A,b; II,5; (2).

602. Harders, W.
On the Gurwitsch radiation of the human eye. Acta Brevia Neerlandica, 3:95, 1933.
It was possible with two different methods to register the mitogenetic radiation of the eye. Origin of radiation is in sclera and not in cornea. (Zentralbl. f. Radiol.)
II,5; (3).

603. Hasselbach, K.A.
Quantitative Untersuchungen über die Absorption der menschlichen Haut von ultravioletten Strahlen. Skandinav. Arch. f. Physiol., 25:55-68, 1911.
Interesting early work on absorption of light by human skin.
I,1,2; (5).

604. Hasselbach, K.A.
Chemische und biologische Wirkung der Lichtstrahlen. Strahlentherapie, 2:403-412, 1913.
General discussion of effect of light on biological materials. A table for the absorption of visible and ultra-violet light by the human skin.
A,b,c,d; F,a; I,1,2,4,5; II,2; (4).

605. Hausmann, W. and Spiegel-Adolf, M.
Über Lichtschutz durch vorbestrahlte Eiweisslösungen. Klin. Wchnschr. 6:2182-2184, 1927.
Skin can be protected against erythemic effects by protein solutions which had been previously irradiated.
F,a; I,4,1,2; (6).

606. Hausser and Vahle
Die Abhängigkeit des Lichterythems und der Pigmentbildung von der Schwingungs-zahl (Wellenlänge) der erregenden Strahlung. Strahlentherapie, 13:41-71, 1922.
Classical paper on wave length dependence of erythema-effect.
I,1,2,4; (1).

607. Haxthausen, H.
Fortgesetzte Untersuchungen über die optischen Verhältnisse der Lupusknötchen und deren Bedeutung für die Finsenbehandlung. Strahlentherapie, 18:674-680, 1924.
Lupus tissue is more transparent for light than healthy tissue; for this reason light is more effective on lupus tissue.
I,4; (3).

608. Heald, C.B.
The permeability of the body to infra-red rays. Brit. M. J., 2:54-55, 1933.
Light from λ7000 to 9000 Å, penetrates deeply into human tissue.
I,1,2; (6).

609. Heineke, H.
Zur Theorie der Strahlenwirkung, insbesondere über die Latenzzeit. München. Med. Wchnschr., 61:807-810, 1914.
I,4; VI,2; (6).

610. Heringa, G.C.
Tatsachen und Vermutungen über die Wirkung des ultravioletten Lichts auf die Haut. IIe Cong. Internat. Lum. Coph., 65-79.
A,b; F,c; H,c; I,1,4; (3).

611. Herzog, R.O. and Gonnell, H.W.
Röntgenspektrographischer Vergleich von Tunicin und Linechin mit Zellulose. Ztschr. f. physiol. Chem., 141:63-67, 1924.
The chemical identity of plant and animal cellulose is proved by way of x-ray spectroscopy.
E,b; VI,1; (2).

612. v. Hevesy, G. and Wagner, O.H.
Die Verteilung des Thoriums im tierischen Organismus. Arch. f. exper. Path. u. Pharmakol., 149*336-342, 1930.
Thorium injected subcutaneously in mice is <u>not</u> selectively absorbed by cancer tissue. The same was found for lead, where as bismuth was absorbed selectively. No spectroscopic, but a "radioactive" method used.
H,a; II,1; VII; (2).

613. Hill, A.V.
The physical nature of the nerve impulse. Nature, 131:501-508, 1933.
Author discusses work of Kalendaroff, Schamarina and Brainness and comes to conclusion that more convincing work is necessary before one can believe work is correct.
II,5; (4).

614. Hill, L.
Penetration of ultraviolet rays of the mercury vapor lamp. J.A.M.A., 90:1310-1311, 1928.
Polemic against Macht and Anderson.
I,1,2,4; (3).

615. Hill, L.
Infra-red rays and ventilation. IIe Cong. intern. Lum. Coph., 160-171, 1932.
Effect of infra-red rays on mucous membranes of nose described. In this connection the infra-red absorption-spectra of following materials given: excised rat-skin, horny layer of the skin, cellophane, water, and white glass. The infra-red emmission spectra for following materials given: 3000 Watt filament lamp, black body 400° C, "Beam" radiator, and electric heater.
A,a; H,a,c; I,1,2,4; (2).

616. Hill, L.
Infra-red rays, comfort and health. Brit. M.J., No. 3781:1096-1097, 1933.
Rays of about λ 3μ are most effective. One-half to one-quarter of all people are sensitive to this radiation.
I,4; (6).

617. Hill, L. and Eidinow, A.
Protection afforded by short infra-red and red rays to a lethal dose of staphylococcus. Brit. M.J., 1:388-389, 1930.
Animals irradiated with light down to λ 2800 Å showed only litter difference in resistance to injection of Staphylococcus. But animals irradiated with light consisting mainly of wave-lengths in the red and the infra-red showed distinctive increase in resistance to Staphylococcus.
G,b,c; I,4; (2).

618. Hoppe-Seyler, F.
Über Muskelfarbstoffe. Ztschr. f. physiol. Chem., 14:106-108, 1890.
Polemic against McMunn's discovery of myohematin. (See Keilin on cytochrom).
F,b; I,1,2; (5).

619. Hoshijima, S.
On the phosphorescence in human tissues. Pt.I. The proof of the phosphorescence in normal human tissues and its measurement. Scient. Papers Inst. Physic. Chem. Research, 20:109-113, 1933.
Interesting paper. Phosphorescence of many tissues discussed and some phosphorescence spectra given.
H,a; II,3,4; (2).

620. Hoshijima, S.
On the phosphorescence in human tissues. Pt. II. On the phosphorescence of human concrements and pathological calcific tissues, and the effect of calcination temperature, upon the phosphorescence of calcined tissues. Scient. Papers Inst. Physic. Chem. Research, 21:15-20, 1933.
Phosphorescence spectra of above materials given.
II,3,4; (2).

621. Huldschinsky, K.
Augensarkome bei Ratten, hervorgerufen durch abnorm lange Ultraviolett-einwirkung. Deutsch. med. Wchnschr., 591:530-531, 1933.
Five rats irradiated daily for 2 hours for one year with a quartz-mercury-vapor lamp. Seven rats irradiated for same time with a Solarlux lamp. All rats showed formation of eye tumors especially those exposed to quartz-mercury-vapor lamp.
I,4; (2).

622. Illingsworth, C.L.W. and Alexander, G.L.
The effect of ultraviolet rays on the rous chicken sarcoma. J. Path. & Bact., 30:365-375, 1927.
The agent of Rous chicken sarcoma is inactivated by short ultra-violet light much more slowly than common bacteria in dilute suspensions. Apparently no chemical change takes place in suspension liquid. Authors have not been able to detect the factors found by Gye after irradiation.
A,g; G,a,b,c; I,4; (3).

623. Jansen, H.
Untersuchungen über die Fähigkeit der baktericiden Lichtstrahlen, durch die Haut zu dringen. Mitt. Finsens Med. Lysinstitut, 4:37-80, 1903.
Interesting work for its time; only of historical interest.
I,1,4; (5).

624. Kaku, S.K.
Infra-red transmission of living tissues. Arch. Phys. Therapy, 14:225-227, 1933.
Absorption in near infra-red determined for mandible of pig with periostium, back skin of pig, rabbit's auricle, and cerebral cranium, skin of orange. Qualitative.
E,b; I,1; (6).

625. Kalendaroff, G.S.
Die Spektralanalyse der Strahlung des markhaltigen Nerven im Ruhezustande und bei künstlicher Erregung. Pflügers Arch. f. d. ges. Physiol., 231:238-251, 1933.
Detailed mitogenetic spectra of resting and stimulated N. ischiadicus of frog. Different artificial stimuli (trauma, mechanical stimulus, faradization) give spectra which differ in many different points. Spectra indicate following reactions: glycolysis, oxydation, splitting of creatin phosphate, and separation of NH_3 components.
II,5; (2).

626. Karpass, A.M. and Lanschina, M.N.
Mitogenetische Strahlung bei Eiweissverdauung. Biochem. Ztschr., 215: 337-343, 1929.
Peptic and tryptic digestion, as well as protein digestion in small intestine emit mitogenetic radiations.
F,a; G,e; II,5; (3).

627. Kartschagin, W. and Sasybin, N.I.
Über die Absorption sichtbarer und ultravioletter Strahlen durch die Gewebe des Menschen. Ztschr. f. d. ges phys. Ther., 36:172-188, 1929.
Visible and ultra-violet absorption of a number of animal tissues.
I,1,2; (3).

628. Kawakami, Z. and Matusaki, T.
Studies of animal malignant tumours by means of spectroscopic photograph. Tr. Jap. Path. Soc., 21:702-704, 1931.
In Japanese.
I,1,2; (3).

629. Kisliak-Statkewitsch, M.
Die mitogenetische Strahlung des Carcinoms. Ztschr. f. Krebsforsch., 29:214-219, 1929.
Mitogenetic radiation of carcinoma tissue investigated. Fresh and old tissue tested.
G,e; II,5; (3).

630. Klenitsky, J.
Die mitogenetische Strahlung des Collumcarcinoms. Ztschr. f. Krebsforsch., 39:60-65, 1933.
Carcinoma of cervix uteri radiates mitogenetically; blood of persons with carcinoma loses its radiation power; this is characteristic for carcinoma but not specific. After a radical operation for adenocarcinoma blood radiation returned (mouse).
A,b; II,5; (3).

631. Klostermann, M.
Über den Nachweis kleinster Bleimengen in Organen auf chemischem und spektrographischem Wege. Naturwissensch., 14:116-118, 1926.
Spectrographic test for lead in tissues and excretions.
A,e; II,1; (4).

632. Kofman, T.
Sur la diffusion par la peau humaine de radiations visibles et de l'ultra-violet. Compt. rend. Acad. d. sc., 196;434-436, 1933.
Absorption of human skin for visible and ultra-violet discussed (See Bachem).
I,1,2; (6).

633. Kögel, G.
Photochemische Stoffnutzung ohne Stoffverbrauch und der Lichtschutz. Strahlentherapie, 43:389-392, 1933.
Possible mechanisms of effect of light on animal organisms discussed, especially erythemic effect and hormones.
D; F,b; I,1,4; (3).

634. Köhler, A.
Einige Neuerungen auf dem Gebiet der Mikrophotographie mit ultraviolettem Licht. Naturwissensch., 21:165-173, 1933.
H,a; I,1,2,4; (2).

635. Kolster, R.
Studien über die Einwirkung gewisser Lichtstrahlen auf sensibilisiertes Gewebe. Mitt. Fins. Med. Lysinst., 10:50-74, 1906.
Good review of early work on photodynamic action. Effect of light on tissue in presence of photodynamic active materials.
I,4,5; II,2; (5).

636. Körbler, J.
Untersuchung von Krebsgewebe im fluoreszenserregenden Licht. Strahlentherapie, 41:510-518, 1931.
Light of λ 3660 Å used. Well illustrated article showing presence of strong fluorescence in tumor tissue. Diagnostic significance discussed.
A,b; I,1; II,2; (3).

637. Latmanisowa, L.W.
Die mitogenetische Sekundärstrahlung des Nerven. Pflüger's Arch. f. d. ges. Physiol., 231:265-279, 1932.
Nerve irradiated with mitogenetic rays gives secondary radiation, which spreads in nerve and which can be received by different parts of nerve. Secondary radiation depends upon method of giving primary radiation. Speed of transmission of mitogenetic excitation is 30 m/sec.
II,5; (3).

638. Latmanisowa, L.
Parabiose des Nerven als Folge mitogenetischer Bestrahlung. Naturwissensch., 21:330, 1933.
Mitogenetic radiation will produce parabiosis of the nerve.
II,5; (3).

639. Latmanisowa, L.
Sur la parabiose mitogénétique du nerf. Ann. de physiol., 10:146, 1934.
Parabiotic action of sender on nerve. (See also article in Naturwissenschaften.)
II,5; (3).

640. Laurens, H.
The physiological effects of radiation. Physiol. Rev., 8:1-91, 1928.
Review limited to action of radiant energy on skin, eye, circulatory system, blood (in vivo) and metabolism. (Author). Large bibliography.
A,b,c; I,4; (4).

641. Lazarenko, T. and Benenson, M.
Zur Frage über den Einfluss der ultravioletten Strahlen auf das Wachstum der Nervenfasern in vitro. Arch. f. exper. Zellforsch., 13:412-429, 1933.
Only detrimental effects noticed.
I,4; II,5; (3).

642. Lefcourt, J.L.
Ultraviolet radiation and penetration. Dental Comos, 73:490-493, 1931.
Qualitative study of absorption of rabbit skin for ultra-violet light.
I,1; (6).

643. Leikola, E.
Photometrische Farbmessung der Haut. Acta Soc. med. fenn. duodecim (Ser. A. fasc. 1. art. 5) 14:1-8, 1930.
Color of skin determined with help of Pulfrich photometer.
I,1; (6).

644. Levy, L.
Uber Farbstoffe in den Muskeln. Ztschr. f. physiol. Chem., 13:309-325, 1889.
F,b; I,1,2; (5).

645. Levy, M.
Wachstumshemmungen nach Bestrahlung mit Ultraviolettlicht. Strahlentherapie, 15:390-397, 1923.
Detrimental effect of mercury light on young rats.
I,4; (6).

646. Lomholt, S.
Die Zirkulation des Goldes bei der Sanocrysin-Behandlung (Quantitative Untersuchungen mittels einer elektrolytischen Methode.) Biochem. Ztschr., 172:141-148, 1926.
Author describes method for handling small quantities of gold by an electrolytic method.
II,1; (3).

647. Lucas, F.F.
Late developments in microscopy. J. Franklin Inst., 217:661-707, 1934.
Review of newer development of ultra-violet microscope and monobromnaphthalene objective. Contains many interesting suggestions and number of new approaches to many problems.
A,g; I,1,2; (2), (4).

648. Lucas, F.F. and Stark, M.P.
A study of living sperm cells of certain grasshoppers by means of the ultraviolet microscope. J. Morphol., 52:91-113, 1931.
All details visible on fixed specimen and some structure of protoplasma can be recognized on photographs taken with ultra-violet microscope.
I,1,2; (3).

649. Lucas, N.S.
The permeability of human epidermis to ultraviolet irradiation. Biochem. J., 25:57-70, 1931
Apparent absorption of ultra-violet light by epidermis as determined by usual methods of photometry not entirely due to true absorption but in part due to scattering of incident light by epidermis which is not optically homogeneous. In shape, absorption curves resemble those of many proteins and aminoacids, e.g. serum albumin, caseinogen, tryptophane, and tyrosine. Percentage of ultra-violet light of physiologically active wave length transmitted through epidermis is higher than previous reported by Hasselbach and is calculated to be about 1.5 to 30 times greater for wave lengths from 4040 Å to 2890 Å respectively.
F,a; I,1,2,4; (2).

650. Ludwig, F. and v. Ries, J.
Uber den Einfluss der Rot- und Blaustrahlen auf das Wachstum. Strahlentherapie, 39:485-489, 1931.
Found beneficial effect of red light on growth of rats.
I,4; (6).

651. McCarrison, R.
The effect of manganese on growth. Indian J. M. Research, 14:641-648, 1927.
II,1; (6).

652. Macht, D.I.
Concerning the influence of polarized light on some convulsant drugs. A contribution to photopharmacology. Proc. Soc. Exper. Biol. & Med., 22:471-473, 1925.
If rats were irradiated with polarized light after injections of certain drugs, convulsions appeared much more frequently than in rats irradiated with non-polarized light. No energy controls given.
I,4; IV,1; (3).

653. Macht, D.I., Anderson, W.T., and Bell, F.K.
The penetration of ultraviolet rays into live animal tissue. J.A.M.A., 90:161-165, 1928.
Spectral transmission of animal skin studied with spectrograph. Later work showed conclusions not entirely correct.
I,1,2; (6).

654. Macht, D.I., Bell, F.K., and Elvers, C.F.
Penetration of ultraviolet rays through animal tissue. Proc. Soc. Exper. Biol. & Med., 23:210-211, 1925.
Absorption spectra of living and dead animal skin. See later papers for details.
I,1,2; (6).

655. Magrou, J.
Actions biologiques à distance et proliférations cellulaires. Lutte contre le Cancer, 27: 1930.
II,5; (6).

656. Magrou, J. and M.
Radiations mitogénétiques et genèse des tumeurs. Compt. rend. Acad. d. sc., 184:905-906, 1927.
Tumor tissue influences B. tumafaciens at a distance.
G,c; II,5; (3).

657. Maki, S.
Beiträge zur Kenntnis der Veränderungen der Netzhaut durch ultraviolette Strahlen. Acta Soc. Ophth. jap., 37:595-622. German. Summary, 48-49 (1933).
Light between λ 4000 λ 3350 Å produces changes in eye of frog, especially in pigment.
I,4; (3).

658. Mandai, H.
Medical application of the polarographic method. II. Microanalysis of copper. Acta scholae med. univ. imp. in Kioto, 14:167-172, 1932.
Copper content in livers and in water measured with polarograph. Water contains 0.0001 to 0.00008 per cent of copper. In liver of normal human beings, copper content was found to be 0.008 per thousand in the embryonic liver 0.047 per thousand.
H,a; II,1; VII; (2).

659. Martland, H.S. and Sochocky, S.A.
The use of a stable colloidal lead in the treatment of cancer. J.A.M.A., 88:911-917, 1927.
Only chemical methods used for detection of lead.
II,1; (6).

660. Mayer, E.
The curative value of light; sunlight in health and disease Pp. 175. New York and London: D. Appleton & Co., 1932.
Applied.
I,4; (6).

661. Miescher, G.
Untersuchungen über die Bedeutung des Pigments für den ultraviolet Lichtschutz der Haut. Strahlentherapie, 45:201-216, 1932.
Absorption spectra given for: quinine chloride in water, tryptophane in water, phenylalanine in water, tyrosine in water, dopamelanine in $NaHCO_3$. Relation of skin pigment to erythema discussed.
F,b; I,1,2,4; (3).

662. Mitchell, L.J.C.
The absorption of ultraviolet rays by living tissue, spectacle glass and some physiological solutions. M. J. Australia, 2:268-271, 1922.
Cornea of eye absorbs all shorter ultra-violet.
I,1; (6).

663. Monaghan, B.R. and Schmitt, F.O.
The absorption spectrum of medullated and non-medullated nerves. Proc. Soc. Exper. Biol. & Med., 28:705-708, 1931.
I,1,2; (3).

664. Morawitz, P.
Pathologische Hautpigmentierung und "Pigmentvitamine." Klin. Wchnschr., 13:324-327, 1934.
Clinical paper.
C; I,1,4;

665. Morel, A., Policard, A., and Revault, P.
Application de la spectrographie à l'étude histochimique de l'aorte normale et pathologique de l'homme. Bull. d'histol. applia. à la physiol., 9:22-30, 1932.
Possible with spectrographic method to determine location of Ca and Mg in aorta.
II,1; (2).

666. Mottram, J.C.
Utilization of immunity in treatment of cancer. Lancet, I:961-962, 1930.
Cancer tissue which had been removed, irradiated, and then injected in animals did not protect the animals against cancer.
G,b; VI,2; (3).

667. Mouriquand, G., Leulier, A., and Nogier
Recherches sur la fixation du strontium dans le rachitisme experimental. Compt. rend. Soc. de biol., 106:18-19, 1931.
The presence of strontium in rachitic rats discussed. Strontium detected by spectrograph.
C; II,1; (3).

668. Moycho, V.
Etude de l'action des rayons ultraviolets sur l'oreille de lapin. Compt. rend. Acad. d. sc., 156:577-579, 1913.
Radiations of λ 3100 to 2900 Å are most active ones on rabbit's ear. Relative efficiency of different wave lengths as well as absorption spectrum of skin discussed.
I,1,2,4; (5).

669. Nakamura, H. and Niwa, S.
The effect of the photodynamic activity of the malignant tumours. Tr. Soc. Path., Jap., 23:712-718, 1933.
Eosin placed around a tumor and irradiated with ultra-violet will produce a decrease of tumor.
F,b; I,4,5; II,2; (6).

670. Nishida, T.
Hygienische Studien über die Wirkung des Sonnenlichtes. Fukuoka-Ikwadaigaku Zasshi, 22:43-44, 1929.
Effects of different drugs studied on animals which were kept in the dark and animals which were kept in sunlight.
I,4; (6).

671. Okajima, S.
Spectral analysis of metals, especially heavy metals in every part of the organs of Japanese. Acta scholae med. univ. imp. in Kioto, 13:417-426, 1931.
Presence of Na, K, Mg, Ca, P, Fe, Cu, Mn, Zn, Bi, Ag in large number of organs of Japanese investigated.
A,b,d; II,1; (4).

672. Okajima, S.
Spectroanalysis of metals, especially heavy metals in the pathological human tissues. Acta scholae med. univ. imp. in Kioto, 14:88-92, 1931.
Presence of number of heavy metals in pathological tissue investigated.
II,1; (3).

673. Okajima, S.
Spectrographic study on some heavy metals administered per os and parenterally. Acta scholae med. univ. imp. in Kioto, 14:93-105, 1931.
Investigated time relation of distribution, etc., of Cd, Au, Ag and Pb in body, administered per os as well as parenterally, by the spectrographic method with following results. In all cases Cd was carried to various organs of animals in comparatively short time and was discharged in urine, feces and bile slowly, but its discharge in urine was distinctly slower than that of other heavy metals. Cd found in genital gland. Distribution of Au, Ag and Pb in body observed in relation to time.
A,b,d; II,1; (2).

674. Orent, E.R. and McCollum, E.V.
Effects of deprivation of manganese in the rat. J. Biol. Chem., 92:651-678, 1931.
Presence of manganese in diet of rats determined by spectral analysis using de Gramont's method.
II,1; (4).

675. Orlow, S.S. and Lewinson, L.B.
Arzneimittel und ultraviolette Strahlen. XII. Mitt. Die kombinierte Einwirkung des Salvarsans und der ultravioletten Strahlen auf die Spirochaete pallida. Ztschr. f. Immunitäts forsch. u. exper. Therap.,
Ultra-violet treatment of animals will increase effect of neosalvarsan.
I,4; (6).

676. Ota, Z. and Yokoi, T.
On the influence of ultraviolet rays upon the growth of chicken sarcoma. In Japanese. Tr. Jap. Path. Soc., 21:802-804, 1931.
Number of blood platelets increases in normal rabbits after irradiation with ultra-violet, but not in splenectomized rabbits. Increase of blood platelets appears more markedly in parathyroidectomized rabbit than in normal rabbit after such irradiation.
D; I,4; (6).

677. Pauli, W.E.
Über künstlich vergrösserte Durchlässigkeit der tierischen und menschlichen Haut für den langwelligen Teil des Spektrums. Strahlentherapie, 25:546-551, 1927.
Possible to increase transmission of human skin by spreading thin layer of oil or glycerin over surface of skin.
I,1,2,4; (3).

678. Pauli, W.E. and Dennig, E.
Über die Durchlässigkeit der tierischen und menschlichen Haut im sichtbaren Teil des Spektrums. Strahlentherapie, 26:761-766, 1927.
Transmission of skin for visible part of spectrum. Transmission curve for light from λ 4500 Å to 10,000 Å.
I,1,2; (3).

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Untersuchungen über das Absorptionsvermögen der Haut im langwelligen Gebiet des Spektrums. Strahlentherapie, 25:532-545, 1927.
Human skin has exceedingly high transmission for light from λ 6000 Å to λ12000 Å. Maximum transmission at λ 7000 to 7600 Å and amounts to about 47.6%. Scattering of light taken into consideration.
I,1,2,4; III,1; (2).

680. Pearce, L. and van Allen, C.M.
Influence of light on the growth and malignancy of a transplantable neoplasm of the rabbit. J. Exper. Med., 45:483-496, 1927.
I,4; (6).

681. Pearce, L. and Brown, W.H.
Influence of light on the growth and malignancy of a transplantable neoplasm of the rabbit. II. J. Exper. Med., 45:727-751, 1927.
Detrimental effect of light could not be noticed.
I,4: (6).

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Penetration of ultraviolet rays. Brit. J. Actinotherapy, 3:54, 1928.
Polemic against Macht and Anderson.
I,1,2; (6).

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Penetration of radiation into animal tissues. Brit. J. Phys. Med., 6:27-30, 1931.
Ultra-violet from λ 2450 Å to λ 3500 Å absorbed by stratum corneum. Region as far as λ 5800 Å in yellow mainly absorbed in cutis vera and its capillaries. Region above λ 5800 Å absorbed by cutis vera and partly transmitted to deeper tissues.
I,1,2: (3).

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The transmission of infra-red radiation through the horny layer of human skin. Brit. J. Radiol., 6:480-486, 1933.
Both stratum corneum and cellophane have absorption band with maximum at about λ 3.0 to 3.1 μ characteristic of alcoholic hydroxyl group. That of cellophane is wider, probably because carbohydrate constitution provides multiplicity of alcoholic groups in various stages of freedom. Both materials have band about λ 3.4 to 3.5 μ characteristic of C-H vibrations. No doubt C-H band in neighborhood of λ 6.8 μ would be found also. Of minor bands of stratum corneum, most coincide with bands attributed to C-H or liquid water. Former include those at λ 1.7 and 2.3 μ and the latter those at λ 0.96, 2.0 and 4.7 μ. There is little likelihood of moisture being present under vacuum used. Faint band at λ 3.8-3.9 μ may be due to S-H linkages. Does not appear in cellophane spectrum. Bands indicative of presence of nitrogen expected, but dispersion insufficient to identify them.
F,c; I,1,2; (1).

685. Pincussen, L.
Die Einwirkung des Lichts auf Stoffwechselvorgänge. Strahlentherapie, 18:625-654, 1924.
A,b; H,c; I,1,4; (3).

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Uber Veränderungen des Stoffwechsels unter Bestrahlung. III. Jacoby, D. Veränderungen im Kohlehydratstoffwechsel. Biochm. Ztschr., 195:449-456, 1928.
General zoological studies. Physiological significance.
I,4; VII; (6).

687. Pincussen, L.
Über Veränderungen des Stoffwechsels unter Brestrahlung. IV. Zuckerstein, E. Untersuchungen über den Fettgehalt der Organe. Biochem. Ztschr. 207: 426-431, 1929.
General physiological importance.
I,4; (6).

688. Pinçussen, L.
Über Veränderungen des Stoffwechsels unter Bestrahlung. VI. Twatsu, T. Veränderungen der Leber-Autolyse bei bestrahlen Tieren. Biochem. Ztschr. 215:372-380, 1929.
Weak radiation increases autolysis, strong irradiation of rabbits leads to low autolysis.
A,e; I,4; (6).

689. Pinçussen, L.
Über Veränderung des Stoffwechsels unter Bestrahlung. VII. Takuma, T. Über den Einfluss des Lichtes auf die Butyrase der Leber und des Herzens. Biochem. Ztschr., 223:341-346, 1930.
Rabbits exposed to common globe of high candle power showed increase of lipase in heart and liver. Quartz-mercury lamp gave similar effects only for liver butyrase.
A,b; B; I,4; (6).

690. Pinçussen, L.
Über Veränderungen des Stoffwechsels unter Bestrahlung. Yokota, S. Der Glutathiongehalt der Organe. Biochem. Ztschr., 239:303-309, 1931.
Glutathion contents of liver, as well as of lung, increases through irradiation of animal.
General physiological interest.
I,4; (3).

691. Pinçussen, L.
Über Veränderung des Stoffwechsels durch Bestrahlung. Takahashi, S. Über den Eingluss verschiedener Strahlenqualitäten auf den Glutathiongehalt der Organe bestrahlter Tiere. Biochem. Ztschr., 266:64-68, 1933.
Experiments not conclusive. Apparently infra-red has pronounced influence on lung. No effect of ultra-violet on muscle recognized. General physiological importance.
I,4; (6).

692. Pinçussen, L. and Roman, W.
Über den Einfluss der Bestrahlung auf das Verhalten des Silbers im Organismus. II. Untersuchungen an einzelnen Organen ausgewachsener Ratten. Biochem. Ztschr., 239:374-403, 1931.
Silver sulphate solutions injected into rats traced in different organs. Differences studied for animals which served as controls and animals which were irradiated. Physiological importance.
I,4; (6).

693. Plotnikow, J.
Über die Streuung des Lichtes in den organischen Körpern. Strahlentherapie 36:469-473, 1931.
III,1; (3).

694. Plotnikow, J.
Lichtstreuung an organischen Medien. IIe Cong. internat. Lum. Coph., 686-690, 1932.
Interesting study of scattering in high molecular weight transparent materials.
A,b,c,d,e; III,1; (3).

695. Plotnikow, J. and Mibayashi, R.
Ausmessungen der Ausbreitung der Wärmestrahlen in verschiedenen Tierkörperteilen nach der photographischen Methode. Strahlentherapie, 40:546-561, 1931.
Absorption, scattering and spreading of light around λ 7300 Å. Methods described in detail.
H,a; I,1,2; III,1; (3).

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Sur une méthode de microincinération applicable aux recherches histochimiques. Bull. Soc. chim. 4ème série, 33:1551-1558, 1923.
Microincineration method in detail.
II,1; VII; (3).

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Détection histospectrographique de cuivre renfermé dans le foie normal et pathologique. Bull. d'histol. applig. à la physiol., 10:94-103, 1933.
II,1; (3).

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Étude par la méthode histospectrographique du cuivre renfermé dans le foie normal et pathologique. Compt. rend. Soc. de Biol., 112:1418-1419, 1933.
Histospectrographic method used for detection of copper in normal and pathological liver.
II,1; (3).

699. Policard, A., Dufourt, A., Anstett, P., and Petey
Application de la méthode histospectrographique à l'étude de la localisation de l'or dans l'organisme au cours de la chrysothérapie. Bull. d'histol. appliq. à la physiol., 10:59-69, 1933.
Determination of gold in tissues.
H,a; II,1; (3).

700. Policard, A. and Morel, A.
Utilisation de la spectrographie de raies en histochimie (Histospectrographie). Compt. rend. Acad. d. sc., 194:491-493, 1931.
Improved method for handling of tissues for spectroanalysis.
H,a; II,1; (3).

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Application de la spectrographie d'émission aux problèmes histochimiques. L'histospectrographie par étincelage direct des coupes. Bull. d'histol. appliq. à la physiol., 9 (2):57-68, 1932.
Method for direct spectral analysis of selected parts of tissue.
H,a; II,1; (4).

702. Policard, A., Morel, A., and Ravault, P.P.
Étude histospectrographique de la localisation du clacium et du magnésium dans l'aorte humaine et de leurs variations au cours de l'hatérome. Compt. rend. Acad. d. sc., 194:201-203, 1932.
Authors able to recognize spectroscopically increased per cent of Ca in the wall of the human aorta in arthritis. Interesting application of newly developed spectroscopic technic.
A,b; II,1; (2).

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Localizing inorganic substances in microscopic sections. The microincineration method. Anat. Rec., 44:349-361, 1930.
Advantages of microincineration method.
I,1,2; II,1; (4).

704. Politzer, G. and Pauli, W.E.
Über die biologische Wirkung der Kathodenstrahlen. Strahlentherapie, 33:704-710, 1929.
VI,2; (6).

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Beitrag zur Steigerung des Lichterythems durch Schmierseife. Strahlentherapie, 40:351-376, 1931.
Interesting article on increase of erythema by presence of certain soaps.
I,4; (6).

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Mikrofluoroskopie und Histologie. Ztschr. f. mikr.-anat. Forsch., 32: 444-458, 1933.
Use of fluorescence microscopy in histology.
II,2; (4).

707. Ramage, H. and Sheldon, J.H.
Mineral content of eyes. Nature, 128:376-377, 1931.
Eyes of cattle contained fairly high percentage of barium. Eyes of other animals did not contain this element. Eyes of all animals contain traces of strontium.
II,1; (2).

708. Ramage, H., Sheldon, J.H., and Sheldon, W.
A spectrographic investigation of the metallic content of the liver in childhood. Proc. Roy. Soc., London, S.B., 113:308-327, 1933.
Livers of 111 children and 14 fetuses investigated. Iron, confirming findings of Ramage, stored during fetal life in liver. Copper also stored in liver during fetal life. Close parallel between relative amounts of iron, copper, and calcium in children. Presence of manganese, rubidium, rubidium-potassium, and silver discussed. Percentage of metals in pathological cases.
Method of determination consisted in ashing liver, burning it in filter paper in front of quartz spectrograph and comparing spectra obtained with those obtained with standard.
II,1; (2).

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No lead in tumor tissue after intravenous injection of colloidal lead. J. Cancer Research, 13:239-241, 1929.
II,1; (3).

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XII. Mittl. Über den Nachweis von Antimon, Arsen und Tellur. Ztschr. f. anorg. u. allg. Chem., 209:356-363, 1932.
Limits of detection: 2×10^{-8} g Arsenic, 10^{-8} g Lead.
II,1; (2).

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Die photographische Platte als Indicator der Vitalität der in vitro Aktivierten Gewebe. Bol. Inst. de mex. exper. para el estud. y trat. del cáncer, 7:921-935, 1930.
Tissue cultures treated with certain pigments leave an impression on photographic plates. Possible explanation of this phenomenon discussed.
I,4; II,2; (6).

712. Roffo, A.H.
La irradiación ultravioleta y eritrosinhemolisis de hematies normales y cancerosos. Prensa méd. argent., 19:869-878, 1932.
A,b; F,b; I,4; (4). (In Spanish)

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Resistance to a tumor-producing agent as distinct from resistance to the implanted tumor cells. J. Exper. Med., 18:416-427, 1913.
Ultra-violet light kills cells of transplantable sarcoma of fowl without notably impairing etiological agent associated therewith.
G,a,b; I,4; (3).

714. Rücker, F.
Durchlässigkeit tierischer Gewebe im Ultrarot. Arch. f. d. ges. Physiol., 231:742-749, 1933.
Reptile and amphibia skins transmit, in general, highly in infra-red. Shape of absorption curve depends very much on water present. Black pigment transmits very well for λ 1-3 μ. Shells and skins of many invertebrates investigated.
G,g; I,1,2; (2).

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Sur l'absorption des rayons ultraviolets par la peau et ses applications therapeutiques. Compt. rend. Acad. d. sc., 179:1448-1450, 1924.
Absorption spectra of skin taken for ultra-violet. (See Bachem.)
I,1,2; (6).

716. Salkind, S. and Šabad, L.
Die mitogenetische Strahlung des Teerkrebses. Vestnick Rontgenol., 9:359-369, 1931.
(In Russian .) Tar cancer of mice if moistened with glucose will give up mitogenetic radiations. Blood of tar cancer mice radiates. Blood radiation stops only in presence of metastases.
A,b; II,5; (3).

717. Salkind, S.J. and Schabard, L.M.
Über die mitogenetische Strahlung des experimentellen Teerkrebses. Ztschr. f. Krebsforsch., 34:216-227, 1931.
Blood of mice retains, in experimental tar carcinoma, ability to radiate. Tar carcinoma <u>in situ</u> gives, on living animals, mitogenetic radiations. Tar-cancer tissue (living) radiates outside animal when moistened with Ringer solution and glucose. Skin cancer of man gave (in 3 investigated cases) positive mitogenetic effect.
II,5; (3).

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Das Erlöschen der mitogenetischen Erregung der Nerven bei Begegnung zweier Erregungen. Pflüger's Arch. f. d. ges. Physiol., 231:252-254, 1932.
Disappearing of action current if two very high electric excitations meet is also noticeable in disappearance of mitogenetic radiation if two stimulating currents meet.
II,5; (3).

719. Schmidt, P.
Bleivergiftung. Ergebn. d. ges. inn. Med., 13:321-331, 1929.
Emission spectral analysis of tissues and body liquids for lead.
A,c,d,e; II,1; (3).

720. Schmidt, W.J.
Polarisationsoptische Analyse des submikroskopischen Baues von Zellen und Geweben. Abderhalden's Handb. d. biol. Arbeitsmeth., Abt. V., Teil 10. No.3, 435-665.
Interesting discussion of study of cells and tissues in polarized light. Good illustrations.
A,g,h; H,a,c; IV,1,2,3; (1), (4).

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Über die Einwirkung von Leber auf Kopro- und Uroporphyrin. Strahlentherapie, 40:340-350, 1931.
Ability of liver to influence copro- and uro-porphyrine.
F,b; I,1,2; (3).

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Untersuchungen über Sterkobilinabbau in Vitro. Klin. Wchnschr., 8:312-313, 1929.
Many schizophrenes secrete very much smaller quantities of stercobilin than normal persons. Stercobilin in vitro under aërobic conditions destroyed very much more easily than under anaërobic conditions. Clinical importance.
VII; (3).

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Die Methode der Schnittveraschung unfixierter tierischer Gewebe. Ztschr. f. wissensch. Mikr., 48:161-191, 1931.
Detailed discussion of tissue incineration.
I,4; (4).

724, Schultze, W.
Über die Reflektion und Absorption der Haut im sichtbaren Spektrum. Strahlentherapie, 22:38-69, 1926.
Only historical interest. See later papers for more detailed discussion of behavior of skin in light.
I,1,2,4; (6).

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Über die Absorption des entzündungserregenden ultravioletten Lichtes in der menschlichen Haut. Strahlentherapie, 22:736-737, 1926.
I,1,2,4; (6).

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Die Farbstoffumwandlung im faulenden Fleische. Ztschr. f. physiol. Chem., 141:153-157, 1924.
F,b; I,1,2; (3).

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Über Thalliumvergiftung. München. Med. Wchnschr., 77:1430, 1930.
Detection of thallium in poisoning cases by means of electrodialysis and emission-spectroscopy mentioned in short note.
II,1; (6).

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Distribution of mineral ash in striated muscle cells. Proc. Soc. Exper. Biol. & Med., 29:349-351, 1932.
Method of microincineration and subsequent examination described. Advantages of procedure.
II,1; (3).

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Topographic similarities between materials revealed by ultra-violet light. photomicrography of living cells and by microincineration. Science, 76:148-150, 1932.
I,1,2; VII; (3).

730. Scott, G.H. and Horning, E.S.
Study of normal and malignant tissues by microincineration. Proc. Soc. Exper. Biol. & Med., 29:708-709, 1932.
II,1; VII; (4).

731. Seide, J.
Der Angriffspunkt der Strahlen in der Zelle. Naturwissensch., 16:128-130, 1928.
Possible explanation of effect of radiation on cell. No theories suggested give true explanation. Must wait with an attempt to understand action of light until more about physiology and biochemistry of cell is known.
H,c; I,4; (4).

732. Sheard, C.
Effects of ultraviolet, visible and infrared irradiation on tissue, with special reference to the parathyroid glands and calcium metabolism. J. Am. Dent. A., 17:2189-2198, 1930.
Popular review of radiation work with special reference to dental work.
H,a; I,1,2,4; (4).

733. Sheard, C. and Brunsting, L.A.
The color of the skin as analyzed by spectrophotometric methods. I. Apparatus and Procedures. J. Clin. Investigation, 7:559-574, 1929.
H,a; I,1,2; (3).

734. Sheldon, J.A. and Ramage, H.
A spectrographic analysis of human tissues. Biochem. J. 25:1608-1627, 1931.
Percentages detected by burning 0.02 cc of standard solutions: Sodium 0.06 per cent, potassium 0.08 per cent, lithium 0.00016, calcium 0.008, rubidium 0.0010, magnesium 0.02, copper 0.002, manganese 0.0008, iron 0.02, silver 0.001, strontium 0.0008, lead 0.02, phosphorus 0.20.
Number of other elements can be easily detected if present in tissue, Copper a mineral constituent of living tissue especially in fetal tissue. Manganese appears spasmodically. Rubidium almsot as widely distributed as copper. Silver found to a less extent than preceding metals. Lead, strontium, and lithium, and lithium only found spasmodically.
H,a; II,1; (2).

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The spectrographic analysis of the metallic content of meconium. Biochem. J., 27:674-677, 1933.
Lines due to Na, K, Ca, Mg, As, Mn, Fe recognizable in all fetal livers. Remarkable for presence of manganese which appears in very strong lines.
II,1; (2).

736. Shinichi, O.
Spektralanalyse von Metallen, besonders Schwermetallen, in verschiedenen Teilen von Organen bei Japanern. Acta scholae med. univ. imp. in Kioto, 13:417-426, 1931.
Great majority of organs of Japanese just as in those of Europeans. A, Fe, Mn, and Zn heavy metals and Na, K, Ca, Mg, and P definitely proved in normal state spectrographically; moreover in few cases, Pb and Hg Bi, Al and Ag found in Japanese.
Ni, Sn and Co not detected in Japanese.
II,1; (3).

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Uber die mitogenetische Strahlung des Arbeitsmuskels und einiger andrer Gewebe. Biochem. Ztschr., 202:115-122, 1928.
Siebert able to check Gurwitsch' work using onion root and yeast technic. Positive effects with excited muscle, ground up muscle, sarcoma tissue and bone marrow.
E,b; G,e; II,5; (2).

738. Siebert, W.W.
Über die Ursachen der mitogenetischen Strahlung. Biochem. Ztschr., 202:123-130, 1928.
Find mitogenetic radiations in resting muscle plus lactic acid, blood charcoal plus oxalic acid, and otherbiochemical models.
F,c; G,e; II,5; (2).

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Über eine neue Beziehung von Muskeltätigkeit und Wachstumsvorgängen. Ztschr. f. klin. med., 109:360-370, 1928.
Siebert's early work on mitogenetic radiation, using onion root and yeast technic.
E,b; G,e; H,a; II,5; (3).

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Aktionsstrahlung des Muskels und Wachstumswirkung des elektrodynamischen Feldes. Biochem. Ztschr., 215:152-161, 1929.
Effect of electrodynamic field on mitogenetic radiation of muscle. Used yeast detectors.
G,e; II,5; (6).

741. Siebert, W.W.
Zur Wachstumswirkung des Arbeitsmuskels. Biol. generalis, 7:69-70, 1931.
II,5; (3).

742. Sonne, C.
The mode of action of the universal light bath. Acta med. Scandinav., 54:336-594, 1921.
Thorough investigation of effect of light on body. Different sections of spectrum investigated separately. Clinical importance.
I,4; (6).

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Action à distance du bacille phosphorescent sur la moelle osseuse. Compt. rend. Soc. de biol., 3:201-203, 1932.
Able to obtain long distance effect on bone marrow from bacteria.
G,c; II,5; (3).

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Action à distance de bacillus tumefaciens sur la nivelle osseuse du lapin. Compt. rend. Soc. de biol., 112:623-625, 1933.
Phosphorescent bacteria have effect on bone marrow after they stop phosphorescing.
G,c; II,5; (3).

745. Soru, E. and Brauner, R.
Nouvelle contribution à l'étude des actions à distance sur la moelle osseuse du lapin. Compt. rend. Soc. de biol., 114:1201-1202, 1933.
Bone marrow exposed to quinine-hydrochinone -methylene blue system, juice of tomatoes and lemons. After 30 to 60 minutes mitogenetic effect recognized.
E,b; F,c; II,5; (3).

746. Spealman, C.R. and Blum, H.F.
Studies of photodynamic action. IV. Photo-stimulation of skeletal muscle. J. Cell & Comp. Physiol., 3:397-404, 1933.
Production of contracture in frog skeletal muscle by ultra-violet is independent of presence of molecular oxygen, whereas response to photodynamic action occurs only in presence of molecular oxygen. (Author),
I,4,5; II,2; (3).

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Einige Ergebnisse über Vorkommen und Wirkung der weniger verbreiteten Elemente Ergebn. d. Physiol., 24:474-516, 1925.
Presence of elements, usually not expected to be present in tissues, discussed. 226 references.
II,1; (4).

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The molecular structure of the cell wall of fibres. A summary of X-ray investigations. Am. J. Bot., 15:525-536, 1928.
E,b; VI,1; (4).

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Einfluss des ultravioletten Lichtes auf die Tiere während der Schwangerschafts- und Lactationsperiode. Arch. f. exper. Path. u. Pharmakol., 169:677-688, 1933.
Rats exposed during pregnancy and lactation period to light and whose food is exposed to ultra-violet radiation give birth to healthier young.
A,b; C; I,4; (6).

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Weitere Versuche über die Wirkung der Organismenstrahlung und Gasung besonders derjenigens des Karzinoms und des ermüdetenMuskels auf die Liesegangschen Ringe. Biol. Zentralbl., 52:413-420, 1932.
Layer of cellophane sufficient to protect detector from vapors from sender.
H,b; II,5; (6).

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Some measurements of the transparency of skin to light. Acta radiol., 5:553-560, 1926.
Absorption of skin of mouse for light down to λ3150 Å has been followed with spectrograph.
I,1,2; (3).

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Lactic acid formation in muscle extracts. VI. The influence of irradiation on lactic acid formation and phosphoric ester accumulation from glycogen. Biochem. J., 24:172-178, 1930.
Possible to increase rate of lactic acid formation from glycogen if muscle extract is irradiated before incubation. In one case rate of lactic acid formation in irradiated sample was three times that in control. Irradiation also leads to alteration of phosphoric ester accumulation. Shorter irradiation resulted in increase of extent of ester accumulation; longer irradiation produced decrease. Highest rates of lactic acid formation coincide with decrease of ester accumulation.
A,e; F,a,c; I,4; (2).

753. Stock, A.
Die Bestimmung kleinster Quecksilbermengen und ihre Bedutung. Naturwissensch., 19:499-502, 1931.
Detection of smallest mercury quantities in biological materials. Chemical methods given here compete very well with best spectroscopic methods.
II,1; (2).

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Über chronische Vergiftungen, speziell die chronische Bleivergiftung. Deutsche. med. Wchuschr., 37:1469-1471, 1911.
Clinical importance in relation to emission spectral-analysis.
A,d; II,1; (6).

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Die Fluoreszenz tierischer Gewebe im ultravioletten Licht. Pflüger's Arch. f. d. ges. Physiol., 142:1-14, 1911.
Fluorescence of large number of animal tissues.
I,4,5; II,2; (6).

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Ultraviolet absorption spectra of tumor extracts, especially of Rous chicken sarcoma. Gann, 26:175-179, 1932.
A number of absorption spectrograms of cancer tissue extracts did not show any difference from absorption spectra of healthy tissue extracts.
I,1,2; (3).

757. Sutro, C.J. and Burman, M.S.
Examination of pathologic tissue by filtered ultraviolet light. Arch. Path., 16:346-349, 1933.
Filtered ultra-violet radiation aids in detecting small areas of disease; these may be imperceptible to naked eye. Usefulness of this tool for surgeon and pathologist.
I,5; II,2; (3).

758. Takahashi, T.
The transmission of ultra-violet rays through animal tissues. Brit. J. Actinotherapy, 5:69-72, 1930.
See second article for abstract.
I,1,2; (3).

759. Takahashi, T.
The transmission of ultra-violet rays through animal tissues. Part II. Brit. J. Actinotherapy, 5:101-103, 1930.
The transmission of rabbit skin for ultra-violet tested by spectrophotometry Light will enter deep enough to come to blood vessels. Absorbed progressively with shorter wave length.
I,1,2; (3).

760. Thenon, J. and Pirosky, I.
Bau der Nervenzelle bei Ultraviolettstrahlen (Spanish). An. del inst. Modelo clin. méd., 13:318-334, 1932.
Marrow of human spine observed with ultra-violet miscroscope.
I,1,2; (3).

761. Thenon, J., and Pirosky, I.
Structure de la cellule nerveuse examinée aux rayons ultra-violets. Compt. rend. Soc. de biol., 111:83-86, 1932.
Photomicrography with ultra-violet gave many details in study of nerve tissues which were not obtainable with visible microphotography.
I,1,2; (3).

762. Thurnwald, H., and Haurowitz, F.
Über die Schwermetalle der menschlichen Leber und ihren spektrographischen Nachweis. Ztschr. f. physiol. Chem., 181:176-181, 1929.
Determined metals in ashes of human liver. Looked for Cu, Sn, Zn. and Mn. P, Mg and Ca were also found. Co and Ni not found. Fraction of liver extract rich in sterase and katalase did not show any difference in metal content.
B; II,1; (3).

763. Trimm, A.
Gerichtlich-chemische Mitteilungen. Deutsche Ztschr. f. d. ges. gerichtl. Med., 11:185-188, 1927.
Use of emission spectrography in lead determination.
II,1; (6).

764. Trogus, C., Halberschadt, H., and Hess, K.
Über das Verhalten von Kathodenstrahlen gegenüber Cellulosepräparaten. Naturwissensch., 18:846-847, 1930.
Obtained some very interesting interference patterns by passing cathode rays from a glow cathode through pin hole in piece of ashfree cigarette paper. See extensive article.
VI,1; (2).

765. Thurnwald, H., and Haurowitz, F. (See No. 762)

766. Ufland, J.
Die mitogenetische Strahlung der Nervenzentren. Fiziol. Z., 16:501-504, 1933. Shows spinal marrow is good source of mitogenetic rays.
II,5; (3).

767. Vierordt, K.
Physiologische Spectralanalysen. IX. Die Sauerstoffzehrung der lebenden Gewebe. Ztschr. f. biol., 14:422-448, 1878.
A,b; I,1,2; (5).

768. Voigt, J.
Über die Verteilung und das Schicksal des Kolloidalen Silbers im Säugetierkörper. II. Mitteilung. Was erfahren wir aus quantitativen Analysen über die Verteilung? Biochem. Ztschr., 63:409-424, 1914.
Plea made for emission spectral analysis of excreta for silver.
A,d,e; II,1; (6).

769. Voigt, J.
Zur Frage der Giftigkeit des Kolloiden Silbers (sog. Kollargolschädigung). Ztschr. f.d. ges. exper. Med., 52:33-40, 1926.
Clinical importance.
II,1; (6).

770. Walkhoff, O.
Ein Beitrag Zur Kenntnis der Leistungen der Mikrophotographie mit sichtbaren und ultraviolettem Licht bei histologischen Untersuchungen insbesondere des Schmelzes. Deutsche Monatschr. f. Zahnh., 48:1201-1208, 1930.
Use of ultra-violet microscope in study the structure of teeth.
I,1,2; (3).

771. Wassiliew, L.L., Frank, G.M., and Goldenberg, E.E.
Versuche über die mitogenetische Strahlung der Nerven. Biol. Zentralbl., 51:225-231, 1931.
Proved that nerve olfactorius in "pike" has ability to produce radiation-energy in form of ultra-violet mitogenetic rays.
G,g; II,5; (3).

772. Wels, P. and Jokisch, M.
Der Einfluss der Quarzlampenstrahlung auf die Fluorescenz von Geweben und Zellen. Pflüger's Arch. f. d. ges Physiol., 223:369-377, 1929.
Frog muscles and embryonic cells of certain mussels show increased fluorescence if irradiated with light of a quartz-mercury-vapor lamp.
G,g; I,4; II,2; (3).

773. Wichmann, P.
Zur biologischen und therapeutischen Wirkung der leuchtenden Wärmestrahlen. Strahlentherapie, 28:189-196, 1928.
Author discusses beneficial effects of red and near infrared rays in therapeutic work.
I,1,4; (6).

774. Wood, F.C.
The detection of small quantities of lead in the tissues. J. Cancer Research, 14:476-485, 1930.
Lead, either in colloidal state or as organic compound, when injected intravenously, can be demonstrated by suitable technique in both inoculated and spontaneous tumors of animals.
Good literature review.
Good discussion of techniques used.
II,1; (2).

775. Wyckoff, R.W. and Ter Louw, A.L.
On the ultraviolet photomicrography of living cells. Science, 74:664-665, 1931.
H,a; I,1,2; (4).

776. Yamada, T.
Biological Researches on the Infra-red Rays. II. Absorption of infra-red rays by rabbit's ears. Acta sholae med. univ. imp. in Kioto, 15:355-357, 1933.
Transmission of near infra-red through living body measured with rabbit's ear. Shaved ear 0,65-0.95 μ thick transmits 38-51% of near infra-red. Hairy ear of same thickness transmits only 28%-34%.
I,1,2; (3).

777. Ypsilanti, H.P. and Paltauf, R.
Zur Frage des Nachweises von Wachstumsstrahlen in malignen tierischen Tumoren. Ztschr. f. Krebsforsch., 32:372-376, 1930.
Unable to detect mitogenetic rays from cancer tissue by means of Liesegang rings.
II,5; (3).

778. Zoglina, I.
Le spectre mitogénétique physiologique des fiebres motrices de sciatique. Ann. de physiol., 10:134-136, 1934.
Mitogenetic ray spectra for nerves excited by mechanical, electric traumatic, optic, reflex (special) given.
II,5; (3).

See also:

6, 60, 61, 88, 89, 93, 99, 107, 121, 122, 130, 150,
155, 164, 235, 236, 237, 241, 268, 284, 288, 294, 295, 323,
325, 327, 342, 353, 361, 371, 372, 374, 401, 415, 423, 431,

432, 445, 449, 450, 451, 454, 456, 485, 797, 801, 802, 824,
825, 828, 957, 999, 1010, 1035, 1037, 1049, 1051, 1122, 1131, 1143,
1144, 1147, 1148, 1149, 1165, 1166, 1168, 1180, 1204, 1289, 1338, 1341,

1376, 1406, 1420, 1519, 1585, 1587, 1631, 1637, 1665, 1713, 1719, 1723,
1724, 1725, 1726, 1727, 1728, 1746, 1766, 1802, 1863, 1906, 1913, 2064,
2072, 2077, 2079, 2187, 2188, 2260, 2326, 2327, 2372, 2386, 2415, 2478,

2558, 2600, 2636, 2684, 2712, 2713, 2737, 2767, 2768, 2772, 2774, 2793,
2922, 2925, 2926, 2938, 2945, 2952, 2962, 2969, 2972, 3203, 3216, 3233,
3245, 3261, 3300, 3313, 3337, 3357.

A. BODY FLUIDS AND TISSUES

g. Isolated tissue cultures.

779. Andersen, H.C., and Fischer, M.
Die Wirkung von α-Strahlen auf Gewebekulturen. Strahlentherapie, 48:500-507, 1933.
Effect of rays on tissue cultures. Effects were similar to those of γrays.
No stimulating effect found.
VI,2; (3).

780. Brunetti, R., and Maxia, C.
Sulla fotografia et la eccitazione della radiazionni del Gurwitsch. Atti Soc. Cultori Sci. Med. Natur. Cagliari, 2: 1930.
Authors believe they have detected, mitogenetic radiations from tissues kept in thin walled quartz tubes, by photographic plates.
H,a; II,5; (6).

781. Bucciante, L., and Foà, A.
Einwirkung der α Strahlungen auf einzelne in vitro gezüchtete Elemente. Arch. f. exper. Zellforsch., 15:190-194, 1934.
Interesting method in studying effect of α-rays.
VI,2; (3).

782. Chrustschoff, G.K.
Über die Ursachen des Gewebewachstums in vitro. I. Die Quellen der mitogenetischen Strahlen in Gewebekulturen. Arch. f. exper. Zellforsch., 9:203-213, 1930.
Author received positive effects with tissue cultures.
II,5; (6).

783-4. Doljanski, L.
Das Wachstum der Gewebskulturen in vitro und die Gurwitsch-Strahlung. Arch. f. Entwcklingsmechn. d. Organ., 126:207-212, 1932.
In 185 apparently carefully controlled experiments the author was not able to detect any effects of mitogenetic senders through quartz.
II,5; (3).

785. Earle, W.R.
Studies upon the effect of light on blood and tissue cells. I. The action of light on white blood cells in vitro. J. Exper. Med., 48:457-473, 1928.
An extreme and rapid degeneration which occurred in tissue cultures of leucocytes from the blood of cats, guinea-pigs, and rabbits is described in detail. Visible light of very low intensity will cause this degeneration.
A,b; I,4; (3).

786. Earle, W.R.
Studies upon the effect of light on blood and tissue cells. III. The action of light on fibroblasts in vitro. J. Exper. Med., 48:683-693, 1928.
A,b; I,4; (3).

787. Fischer, A.
Multiplikation der Wirkung kleinster Radiumdosen auf Gewebezellen in vitro. Strahlentherapie, 40:465-469, 1931.
I ,2; II,5; (4).

788. Guillery, H.
Über Bedingungen des Wachstums auf Grund von Untersuchungen an Gewebekulturen. Virchows Arch.f. path. Anat. 270:311-359, 1929.
Relation of tissue culture work to mitogenetic ray problem. Extensive literature list for culture work.
II,5; I,4; (4).

789. Jaeger, C.H.
Der Einfluss der Blutstrahlung auf die Gewebskultur. Ztschr.f. Zellforsch.u.mikr.Anat., 12:354, 1930.
Some very irregular results with blood as sender and tissue cultures as detectors.
A,b; II,5; (6).

790. Kemp, T. and Juul, J.
Influence of ultra-violet rays upon mitoses in tissue cultures. Acta path. et microbiol. Scandinav., 9:222-235, 1932.
Effect of unfiltered ultra-violet on mitotic cells in tissue cultures is to retard mitosis or to stop it entirely, similar to x-ray action.
I,4; (3).

791. Laser, H.
Über den Stoffwechsel von Gewebekulturen unter besonderer Berücksichtigung der Anaerobiose. Arch. f. exper. Zellforsch., 15:54, 1934.
General physiological interest.
VII; (6)

792. Lasnitzki, A. and Klee-Rawidowicz, E.
Zur Frage der "mitogenetische" Induktion von Warmblüterzellen. Ztschr. f. Krebsforsch., 34:518-525, 1931.
Results entirely negative.
II,5; (3).

793. Mayer, E.
Formbildung und Wachstum von gezüchteten Zellverbänden ("Reinkulturen") Arch. f. Entwcklngsmechn. d. Organ., 130:382-494, 1933.
Effect of ultra-violet light on tissue cultures. Ultra-violet had retarding effect only, part of culture not next to exposed area showed increased growth.
I,4; (4).

794. Mayer, E.
Über die biologische Messung ultra-violetter Strahlengemische durch Gewebekulturen. Strahlentherapie, 40:770-771, 1934.
Visible light has no effects on tissue cultures. Ultra-violet retards growth of tissue cultures.
I,4; (3).

795. Meyer, Edmund
Die Wirkung von ultravioletter Strahlengemischen auf Gewebekulturen. Strahlentherapie, 39:148-193, 1931.
Fibroblast cultures exposed to quartz mercury lamp. Visible light has no effect. Ultra-violet has retarding effect, but the presence of visible light has no effect on the ultra-violet action. Continuous light and monochromatic lines have the same effects.
I,4; (3).

796. Roffo, A.H.
Die Lichtwirkung auf die Entwicklung der normalen und neoplastischen Zellkulturen in vitro (in Spanish, German summary). Bol. Inst. de med. exper. para el estud. y trat. del cancer, 9:511-531, 1932.
Effect of light of common electric globe on different tissue cultures.
I,4; (6).

797. Roffo, A.H. and Calcagno, O.
Fluoresceinderivate und ihr Einfluss auf die Zellvermehrung in Kulturen normaler und neoplastischer Gewebe in vitro. Bol. Inst. de med. exper. para el estud. y. trat. del cáncer., 9:69-86, 9:88-89, 1932.
117 compounds studied all had an inhibitory effect on tissue cultures.
A,f; I,4,5; II,2; (3).

798. Rusinoff, P.G.
Weitere Untersuchungen über mitogenetische Strahlen und Induktion. Arch. f. Mikros. und Entwicklung, 104:121-124, 1925.
Effect on exposure of tissue on mitogenetic effect.
II,5; (3).

799. Schade, H.
Concerning a physicochemical method of carrying out tissue cultures in their own plasma without the additions hitherto necessary. Arch. f. exper. Zellforsch., 15:121-127, 1934.
Interesting technical article.
H,a; VII; (2).

800. Schreiber, H.
Neuere Untersuchungen über die Wellenlängenabhängigkeit des lichtbiologischen Effektes. Cong. internat. Lum. Coph., 733-739, 1932.
Effect of measured quantities of monochromatic light on isolated tissue cultures. (First investigation). Light down to λ2300 Å investigated. The wave-length dependence of destructive action of light seems to be same as on other living materials.
I,4; (2).

801. Smakula, A. and Laser, H.
Optische Untersuchungen an Gewebszellen. Strahlentherapie, 49:489-497, 1934.
Absorption down to λ2300 Å measured with photoelectric cell and double monochromator for living tissue cultures, watery cell suspensions and extracts, serum and tissue sections. Normal connecting tissue (from cultures) and cultured carcinoma tissues show two absorption bands at λ2800 Å and λ2600 Å. Two different types (smooth and striated) muscle tissues differ in their absorption. Normal human skin has absorption band at λ2600 Å; after irradiation with ultraviolet at λ2800 Å. Data for absorption bands also given for: muscle tissue, serum of normal and carcinomatous persons, kidney, heart muscle, sarcoma tissue, carcinoma tissue, brain (mouse), skin (chicken, embryo) embryo extract, carcinoma extract, mouse liver, normal human skin, irradiated skin of chicken and man. Thorough paper. Interesting technique.
A,c,d,f; H,a; I,1,2,4; (2),(4).

802. Wohlgemuth, J. and Szörényi, E.
Über die Wirkung des Lichtes auf den Chemismus der Zelle. I. Versuche an Gewebsschnitten. Biochem. Ztschr. 264:371-388, 1933.
General physiological observations of effect of unfiltered light on certain functions of tissue sections.
A,f; I,4; (3).

803. Wohlgemuth, J. and Szörényi, E.
Über die Wirkung des Lichtes auf den Chemismus der Zelle unter dem Einfluss von Sensibilisatoren. Klin. Wchuschi., 12:1533-1534, 1933.
Light has almost no influence on respiration in living tissue but it increases glycolysis. In presence of sensibilisators, fermentation goes down and respiration increases. Process not dependent on cell structure and is increased by HCN independent of temperature.
I,4,5; (2).

804. Zakrzewski, Z.
Über die Wirkung der Gurwitsch-Strahlung auf Gewebekulturen in vitro. Arch. f. exper. Zellforsch., 14:471-478, 1933.
Author has positive effects with mitogenetic radiation effect using tissue cultures as detectors and ground up onion root as sender.
E,b; II,5; (6).

See also:

549, 622, 647, 720, 824, 945, 3261, 3300.

A. BODY FLUIDS AND TISSUES

h. Chromosomes.

805. Altenberg, E.
The limit of radiation frequency effective in producing mutations. Am. Nat., 62:540-545, 1928.
Ultra-violet had no appreciable effect on mutation frequency of drosophyla.
I,4; (6).

806. Blackwood, O.
Further x-ray evidence as to the size of a gene, and as to the energy of mutation by ultra-violet rays. Physical Rev., 40:1034, 1932.
Short abstract of paper given before the Am. Physical Soc.
I,4; VI,1,2; (2).

807. Hanson, F.B.
Radiation - Genetics. Physiol. Rev., 13:466-496, 1933.
Author reviews the genetical changes produced by corpuscular radiation.
VI,2; (1), (4).

808. Luyet, B.J.
An attempt to produce mutation in mucoraceae by means of ultra-violet rays. Proc. Soc. Exper. Biol & Med., 29:107-108, 1932.
Results entirely negative.
I,4; (3).

809. MacDougall, M.S.
Another mutation of Chilodon uncinatus produced by ulta-viplet radiation, with a description of its maturation processes. J. Exper. Zool., 58:229-236, 1931.
I,4; (3).

810. Noethling, W. and Stubbe, H.
Untersuchungen über experimentelle Auslösung von Mutationen bei Antirrhinum majus. V. Ztschr. f. indukt. Abstanmungs - u. Vererbungsb., 67:152-172, 1934.
Increase of gene mutation rate and production of trisomes after irradiation of mature male gon. with light. Absorption relation of gon. Analysis of gene mutations produced. Pollen has a pronounced absorption band at λ 3000 Å. Light around λ 3000 Å will kill if given in large doses, but will increase the gene mutation rate of above plant if given in moderate doses. Apparently light of λ 3660 Å and λ 4350 Å has some slight effect on gene mutation if given in large doses.
I,1,2,4; (2).

811. Promptov, A. N.
The effect of short ultra-violet rays on the appearance of hereditary variations in Drosophila melanogaster. J. Genetics, 26:59-74, 1932.
Ultra-violet rays exercise influence on genotypical variations in general; their genetical effectiveness is exceedingly feeble. They probably possess peculiar qualitative influence. Introduction of greater precision from physical point of view presents considerable difficulties (degree of intensity, exposition, etc.).
I,4; (3).

812. Scott, G.H.
Sur la disposition des constituants minéraux du noyau pendant la mitose. Compt. rend. Acad. d. sc., 190: 1323-1324, 1930.
Mineral content of nucleus observed during cell division by microincineration method of Policard.
II,2; VII; (3).

813. Stubbe, H.
Untersuchungen über experimentelle Auslösung von Mutationen bei Antirrhinum majus. I. Ztschr. g. indukt. Abstammungs - u. Vererfungsl., 56:1-38, 1930
Very slight mutations obtained with ultra-violet. More work promised.
I,4; (3).

814. Stubbe, H.
Untersuchungen über experimentelle Auslösung von Mutationen bei Antirrhinum majus III. Die Erhöhung der Gen-Mutationsrate nach Röntgenstrahlung, Bestrahlung mit ultra-violettem Licht, Temperaturehocks nebst einigen Bemerkungen über die in diesen Versuchen induzierten Variationen. Ztschr. f. indukt. Abstammungs - u. Vererbungsl. 60:474-513, 1932.
See later articles with more detailed discussion of ultra-violet.
I,4; VI,2; (3).

815. Wyckoff, R. W.G. and A.H. Ebeling
Some ultra-violet photomicrographs made with different wave lengths. J. Morphol., 55:131-135, 1933.
Photographs with ultra-violet light taken of grasshopper spermatocytes.
I,1,2; (3).

816. Wyckoff, R., Ebeling, A. and Terlouw, A.
A comparison between the ultra-violet microscopy and the feulgen staining of certain cells. J. Morphol., 53:189-199, 1932.
"Ultra-violet photomicrographs of vesting and dividing chicken macrophages and fibroblasts and of erythrocytes and lymphocytes are described. The structures found in these photographs are compared with the ones brought out in fixed material by Feulgen staining and found to be essentially similar in appearance.
I,1,2,4; (2).

See also:

720, 2560, 2604, 2605.

B. ENZYMES (Ferments)

817. Agulhon, H.
Actions des rayons ultraviolets sur les diastases. Compt, rend. Acad. d. sc., 152:398-401, 1911.
The following enzymes were exposed to the light of a mercury vapor lamp: sucrase, amylase, emulsine, pepsine, presone, catalase, lactase, tyrosinase, peroxydase and their destruction studied. Light above λ3022 Å is not active.
I,4; (5).

818. Agulhon, H.
Sur le mécanisme de la destruction des diastases par la lumière. Compt. rend. Acad. de sc., 153:979-982, 1911.
Visible light inactivates sucrase, lactase, and catalase only in the presence of oxygen. Ultra-violet will inactivate, also, in the absence of O_2. It is not yet possible to give a unique explanation of the action of light.
I,4; (5).

819. Agulhon, H.
Action de la lumière sur les diastases. Ann. Inst. Pasteur, 26:38-47, 1912.
All ten diastases investigated were destroyed by ultra-violet light. Some of the diastases are also destroyed by visible light but only in the presence of oxygen.
I,1,4; (2).

820. Astbury, W.T. and Lomax, R.
Remarks to Bernal's and Crowfoot's article "X-Ray photographs of crystalline pepsin." Nature, 133, 795, 1934.
Interesting discussion.
F,a; VI, 1; (4).

821. Azuma, T.
Studies on serum lipase. J. Biochem., 4:239-269, 1924.
The serum butyrase is quite resistant to the action of ultra-violet rays. This is also true in the presence of fluorescent dyestuff. Injection of eosin, followed by exposure to ultra-violet rays, exerts no influence on the content of serum butyrase.
I,4; II,3; (3).

822. Bach, A.
Uber das Verhalten der Peroxydase gegen Licht. Ber. deutsch. chem. Gesellsch. 41:225, 1908.
Peroxydase was exposed to sunlight in an Erlenmeyer flask. Activity of the peroxydase declined.
I,4; (6).

823. Batelli, F. and Stern, L.
Action de la lumière sur la catalase. Compt. rend. Soc. de biol., 68:1040-1042, 1910.
The effect of sunlight on catalase is discussed. No oxygen necessary for the destruction of catalase by light.
I,1,4; (5).

824. Bering, F.
Beiträge zur Wirkung des Lichtes. München. med. Wchnschr., 59:2795, 1912.
Author was able to notice a stimulative effect of small energies on enzymes. The effect of light on surviving tissues is studied in detail.
A,f,g; I,1,4,5; II,2; (6).

825. Bering, F. and Meyer, H.
Experimentelle Studien über die Wirkung des Lichtes. Untersuchung über die Wirkung auf die Oxydationsfermente. Wirkung der verschiedenen Strahlengruppen und ihre Sensibilisierung. Strahlentherapie, 1:411-437, 1912.
Qualitative work. Many generalizations.
A,b,f; F,a; I,1,2,4; (3).

826. Bernal, J.D. and Crowfoot, D.
X-Ray photographs of crystalline pepsin. Nature, 133:794-795, 1934.
The first x-ray photograph of a crystalline protein has been taken.
Using the density and the data from the x-ray spectrograms the molecular weight and the structure of pepsin are discussed.
F,a; VI,1; (1).

827. Billig, E. Kannegiesser, N. and Solowjew, L.
Die Spektralanalyse der mitogenetischen Strahlung bei Pepsinverdauung und bei Spaltung von Glycyl-Glycin durch Erepsin. Hoppe-Seyler Ztschr. f. Physiol. Chem., 210:220-227, 1932.
F,a; II,5; (3).

828. Bloch, Br. and Schaaf, F.
Über die Pigmentbildung in der Haut, unter besonderer Berücksichtigung der optischen Spezifität der Dopaoxydase. Klin. Wchnschr., 11:10-14, 1932.
Dopaoxydase is probably responsible for the pigment formation in animals. It is a specific enzyme that reacts with the naturally appearing 1-3, 4- dioxyphenylalanine but not with d-3, 4-dioxyphenylalanine.
A,f; F,b; I,1,2; (3).

829. Calvin, D.B.
The effect of irradiation by the mercury vapor are on the activity of pepsin and trypsin. Am. J. Physiol., 93:639, 1930.
Activity of pepsin and trypsin on gelatin and casein solutions. Temperatures and other factors controlled. Effect of the light of the ultra-violet lamp is to decrease the activity of these enzymes.
Short report of a paper given before the American Physiological Society. More work promised.
I,4; (3).

830. Čech, A.
Gurwitschs Strahlen und deren Zusammenhang mit den lytischen Fermenten und Rachitis. (Tchech). Casop. lek. česk., 70-74, 1932.
Author believes he has photographed mitogenetic rays passing through a celloidin (!!) sheet. Senders: Bacteria yeast, bacteriophage (Ber.d.ges. Biol.A).
H,a; G,b,c; II,5; (6).

831. Chauchard, A.
Étude quantitative de l'action des rayons ultraviolets monochromatiques sur l'amylase. Compt. rend. Acad. d. sc., 156:1858-1860, 1913.
Good article on the effect of monochromatic light on amylase. The photochemical action of ultra-violet light is proportional to the absorption of these rays in the solution containing the amylase. The energy necessary to raise the temperature of the solution 1/4°C. decomposes 1/40 of diastase.
I,1,2,4; (2).

832. Chauchard, A. and Dartre, A.
Action des rayons ultraviolets monochromatiques sur l'amylase et la lipase du suc pancréatique. Compt. rend. Acad. d. sc., 158:1575-1577, 1914.
The absorption spectra and the effect of measured quantities of monochromatic light were studied for amylase and lipase of pancreas extracts. Amylase is attacked by light shorter than λ 2800 Å. Lipase is already destroyed by light beginning with λ 3300 Å.
There seems not to exist any relation between the absorption spectra of pancreas extract, which has a maximum at λ 2813Å, and the destruction spectra of amylase and lipase.
D; I,1,2,4; (1).

833. Chauchard, A. and Mazoué, B.
Action des rayons ultraviolets sur l'amylase, l'invertine et le mélange de ces deux diastases. Compt. rend. Acad.d. sc., 152:1709-1711, 1911.
Amylase and invertase are destroyed by the light from a mercury-vapor lamp. Amylase is very much more sensitive to ultra-violet light than invertase.
I,4; (5).

834. Claus, G.
Über die Dunkelwirkung fluoreszierender Farbstoffe auf Diastase. Biochem. Ztschr., 204:456-466, 1929.
The addition of fluorescing material to diastase increases the activity of the enzyme. However, enzyme preparations from different sources behave differently.
I,1,4,5; II,2; (3).

835. Collier, H.B. and Wasteneys, H.
Action of radiation on enzymes. Australian J. Exper. Biol. & M. Sc., 9:89-112, 1932.
Ultra-violet (λ2000-2130 Å) destroys urease, malt amylase, pepsin, and phosphatase. Urease is readily destroyed by short infra-red radiation (.750-1,400 μ). Phosphatase is destroyed by visible radiation. A starch amylase digest is slightly stimulated by "visible" radiation. The enzyme alone is unaffected. A peptic digest of coagulated egg albumin is strongly stimulated by visible radiation. The enzyme alone is unaffected. The probable mechanism of these digest stimulations is absorption of radiation by the colloidal substrate, with degradation of radiant to kinetic energy, and consequent increase in the reaction rate. The rate of destruction of pepsin by ultra-violet in dependent on H-ion concentration in the range of pH 1-7. The destruction parallels enzyme activity in hydrolysis, showing a maximum at the optimum pH. H-ion concentration has, therefore, an effect on pepsin which is independent of the ionization effect. (Authors' abstract.)
I,4; (2),(4).

836. Copisarow, M.
Radiation and enzyme activity. Nature, 130: 1001-1002, 1932.
Short notice about radiation, not very clear. Apparently author has reference to mitogenetic rays without mentioning them. No further information was obtainable through written inquiry. See article in Protoplasma.
II,5; (6).

837. Damianovich, H. and Williams, A.
Ultra-violet absorption spectra of enzymes and alkaloids. An. soc. cient., Argentina, 84:79-81, 1917.
Polemic against Dhéré.
F,c; I,1,2; (6).

838. Emmerling, O.
Die Einwirkung des Sonnenlichts auf die Enzyme. Ber. deutsch chem. Gesellsch, 34:3811-3814, 1901.
Very little effect of sunlight on a number of enzymes was noticed. No uniform effects obtained.
I,4; (6).

839. Euler, H. v. and Laurin, I.
Verstärkung der Katalasewirkung in Hefezellen. II. Ztschr. f. physiol. Chem., 106:312-316, 1918.
Sunlight will weaken the catalase activity in living cells. Yeast catalase is not activated through sunlight.
G,e; I,1,2,4; (3).

840. Fermi, C., and Pernosse, L.
Über die Enzyme. Ztschr. f. Hyg. u. Infektionskr., 18:86-92, 1894.
The effect of sunlight on a large number of enzymes was tested. Varied results were obtained, but most enzymes were inactivated when exposed to intense sunlight.
I,4; (5).

841. Gorbach, G.
Über die Verwendbarkeit des Zeisschen Eintauchrenfraktometers zur Messung der Saccharasewirkung. Biochem. Ztschr. 217:440-453, 1930.
Refractometer method used to determine saccharase activity; not as exact as polarimeter method.
F,c; IV,1; V,2; (5).

842-3. Gorbach, G., and Lerch, K.
Über den Einfluss des ultravioletten Lichtes auf die Saccharase. I. Die Ultraviolettspektren verschiedener reiner Saccharasepräparate. Biochem. Ztschr., 219:122-135, 1930. Inst. of Biochem. Graz.
All preparations showed band at λ 2700 Å. Sharpness of band depends on purity of enzymatic substance. If saccharase is irradiated with mercury lamp (cooled) no change takes place in band. Pure tryptophane also absorbs at λ 2700 Å. Increase of tryptophane increases enzyme reactivity. Irradiated tryptophane increased absorption in ultra-violet. Seems that tryptophane is carrier of the enzyme.
Good absorption spectra taken with Zeiss spectrograph and Scheibe method.
F,a,c; I,1,2,4; (2).

844. Gorbach, G., and Lerch, K.
Über den Einfluss des ultravioletten Lichtes auf die Saccharase. II. Mitt. Die Rolle von Tryptophan und Hefegummi. Biochem. Ztschr. 235:259-266, 1931.
"Hefegummi" has only continuous absorption in ultra-violet. Tryptophan has band at λ 2700 Å, same as saccharase.
F,a,c; I,2,4; (3).

845. Gorbach, G., and Pick, H.
Die Ultraviolettinaktivierung von Saccharase in ihrer Abhängigkeit von der Wasserstoffionenkonzentration und dem Ozon. Monatschr. f. Chem. 61:29-38, 1932.
Pure enzyme highly sensitive. Quartz mercury lamp used directly. (Primitive technique.)
F,b; I,4; (6).

846. Gorbach, G. and Pick, H.
Die ultraviolett-Inaktivierung von Saccharase in ihrer Abhängigkeit von der Wasserstoffionekonzentration und dem Ozon. Sitzungsb. d. Akad. Wiss. Wien. Naturwiss. Kl. II b 141:397-406, 1932.
Formation of ozone not important for destruction of saccharase by ultra-violet.
I,4; (6).

847. Green, R.
On the action of light on diastase, and its biological significance. Philos. Transact. Royal Soc. London, 188:167-190, 1897.
Red, orange and blue light have beneficial effect on action of diastase. Green, violet and ultra-violet have detrimental effect.
I,4; (5).

848. Gurwitsch, A. and L.
Die Fortleitung des mitogenetischen Effektes in Lösungen und die Beziehungen zwischen Fermenttätigkeit und Strahlung. Biochem. Ztschr., 246:127-133, 1932.
Enzymatic effect (a chain reaction) brought into action by mitogenetic readiation.
II,5; (2).

849. Gurwitsch, A. and L.
Uber den Ursprung der mitogenetischen Strahlen. Arch. f. Entwcklngsmechn. d. Organ. 105:470-472, 1925.
Description of experiments on mitotine and mitotose.
II,5; (3).

850. Hannes, B. and Jodlbauer, A.
Versuche über den Einfluss der Temperatur bei der photodynamischen Wirkung und der einfachen Lichtwirkung auf Invertase. Biochem. Ztschr., 21:110-113, 1909.
Judging by the temperature coefficient of the action of light directly and of light through the photodynamic action of eosin, both reactions are the same.
I,4,5; (6).

851. Helferich, B. and Brieger, G.
Über Emulsin XII. III. Die Schädigung von Emulsin durch ultraviolette Strahlen. Ztschr. f. physiol. Chem., 221:94-98, 1933.
Emulsin is destroyed by ultra-violet light. The destruction, however, is differential depending upon whether emulsin is tested against B-d glucosid or d-d mannosid.
I,4; (2)

852. Hussey, R.G. and Thompson, Wm. R.
The effect of radiations from a mercury arc in quartz on enzymes. I. The effect of ultra-violet radiation on pepsin in solution. J. Gen. Physiol., 9:217-219, 1925.
Pepsin in solution is inactivated by the radiations from a mercury arc in quartz.
I,4; (6).

853. Hutchison, A.H. and Ashton, M.R.
The effect of radiant energy on diastase activity. Canadian Research, 9:49-64, 1933.
The effect of monochromatic light on the diastase of saliva and of malt and the production, first, of erythrodextrin, and, second, of maltose from starch, is used as an indicator of the enzyme activity. The stimulative and retarding effect of the different wavelengths is discussed. No energy controls described.
I,1,2,4; (2)

854. Jamada, K. and Jodlbauer, A.
Die Wirkung des Lichtes auf Peroxydase und ihre Sensibilisierung durch fluorescierende Stoffe. Biochem. Ztschr., 8:61-83, 1908.
Effect of light on peroxydase with and without presence of fluorescing materials. Long reference list.
I,1,2,5; II,2; (3).

855, Jodlbauer, A.
Über die Wirkung photodynamischer (fluorescierender) Substanzen auf Paramäcien und Enzyme bei Rontgen- und Radiumbestrahlung. Deutsche Arch. f. klin. Med., 80:488-491, 1904.
X-rays and radium have no influence on photodynamic effects of fluorescing substances, on paramecia and enzymes.
G,f; I,4,5; II,2; VI,2; (3).

856. Jodlbauer, A.
Über den Einfluss des Sauerstoffes bei der Schädigung der Fermente (Invertin) durch Wärme. Biochem. Ztschr., 3:483-487, 1907.
Visible light affects enzymes in presence of oxygen, while heat affects enzymes in absence of oxygen.
I,4; (3).

857. Jodlbauer, A.
Über die Lichtwirkung auf Invertin bei Anwesenheit und Abwesenheit von Rohrzucker und anderen Stoffen. Biochem. Ztschr., 3:488-502, 1907.
Light effect on invertase modified by certain carbohydrates. Heat effects changed by presence of large number of different substances.
F,c; I,4; II,2; (4).

858. Jodlbauer, A. and Tappeiner, H.v.
Über die Wirkung des Lichtes auf Enzyme in Sauerstoff-und Wasserstoffatmosphäre, verglichen mit der Wirkung der photodynamischen Stoffe. Deutsche Arch. f. klin. Med., 85:386-394, 1905.
Photodynamic action a speeding up of usual action of visible light. Photodynamic action effective only in present of O_2.
F,b; I,4,5; II,2; (3).

859. Jodlbauer, A. and Tappeiner, H.v.
Über die Wirkung des ultravioletten Lichtes auf Enzyme (Invertin). Deutsche Arch. f.klin. Med., 87:373-388, 1906.
Oxygen not necessary for action of ultra-violet on invertase. Action of ultra-violet not increased by presence of photodynamic substance.
F,b; I,4,5; II,2; (5).

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Über die Wirkung des ultravioletten Lichtes auf die Dehydrogenasen der Bernsteinsäure und der Glyzerinphosphorsäure. Skandinav. Arch. f. Physiol., 54:115-119, 1928.
Above enzymes easily destroyed by light from quartz-mercury-vapor lamp.
I,4; (6).

861. Karapetjan, O.K.
Experimentelle Untersuchungen zur Frage des Einflusses der ultravioletten Strahlen auf die fermentativen Bluteigenschaften des wachsenden Organismus. Ztschr. f.d. ges. phys. therap., 45:8-17, 1933.
Experiments were conducted on 9 young dogs, 6 radiated, 3 controls. Irradiation with mercury vapor lamp at 50 cm. distance. Results: Proportional to the intensity of radiation an increase of activity of blood amylase was observed. With weak radiation catalase also increased. Lipase unchanged. In general these animals were lighter in weight but resisted intermittent infections better.
I,4; G,b; (6).

862. Keeser, E.
Über die biologische Wirksamkeit des sichtbaren monochromatischen Lichtes. Arch. f. exper. Path. u. Pharmakol., 164:626-634, 1932.
Good review of effects of visible light. Investigated effects of filtered light of fairly definite energy values on lecithin, catalase, trypsin-casein, pepsin-ovalbumin, pepsin-gelatine, lipase-ethylbuttiric acid. Increased activity of materials in every case.
F,a; I,1,2,5; (2).

863. Keilin, D.
Cytochrome and the supposed direct spectroscopic observation of oxidase. Nature, 133:290-291, 1934.
Believes that the bands found by Warburg and thought to be bands of oxidase are nothing other than the bands of cytochrome.
F,a; I,1,2; (2).

864. Koeppe, H.
Licht und Katalase. Strahlentherapie. 34:598-604, 1929.
Interesting, rather philosophical, discussion of effect of light on catalase.
H,c; I,4; (4).

865. Koeppe, H.
Ultraviolette Strahlen und Katalase. Arch. f. Kinderh., 89:3-72, 1929.
Effect of ultra-violet on hydrogen peroxyde and catalase.
F,c; I,4; (6).

866. Kögel, G.
Über die photochemische Entstehung und Wirkung der Fermente. Strahlentherapie, 45:107-114, 1932.
Theoretical discussion of formation of melanines under influence of light from phenols, poliphenols and aminophenols.
F,b; I,2,4; (3).

867. Kohl, F.G.
Über die Reversibilität der Enzymwirkungen und den Einfluss äusserer Faktoren auf die Enzyme (Invertase, Maltase). Beitr. bot. Zentraebl., 23:64b-640, 1908.
Action of invertase and maltase as influenced by daylight.
I,4; (6).

868. Krestowinkoff, A.
Die Wirkung des Lichtes auf den Entfärbungsverlauf in einem Dehydrogenase-Methylenblausystem. Standinav, Arch. f. Physiol., 52:199-208, 1927.
Very weak radiation cuses decolorization of methylene blue in system dehydrogenase - H - donator - methylene blue.
I,4; (6).

869. Kubowitz, F. and Haas, E.
Ausbau der photochemische Methoden zur Untersuchung des sauerstoffübertragenden Ferments. (Anwendung auf Essigbakterien und Hefezellen). Biochem. Ztschr., 255:247-277, 1932.
37 lines (λ1930-6710Å) isolated. Method for calculation of light sensitivity and absorption coefficient given. Absorption spectra for vinegar bacteria and yeast. Comparison of enzyme spectrum of haemoglobin and chlorocruorin. Oxygen carrying enzyme and cytochrome not identical.
G,c,e; H,a; I,1,2; (1).

870. Kubowitz, F. and Haas, E.
Nebenbanden des sauerstoffübertragenden Ferments. Naturwissensch., 20:469, 1932.
Short notice.
I,1,2,4; (2).

871. Kubowitz, F. and Haas, E.
Über das Zerstorungsspektrum der Urease. Biochem. Ztschr., 257:337-343, 1933.
Authors measured absorption spectrum of urease and effectivity curve of measured amounts of ultra-violet. Both sets of data fit very well together. Excellent set-up and method.
I,1,2,4; (2).

872. Kuhn, R., Hand, D.B. and Florkin, M.
Über die Natur der Peroxydase. Ztsch. f. physiol. Chem., 201:255-258, 1931.
Absorption spectra of peroxydase from different sources given. Relation to iron content of peroxydase given.
I,1,2; (2).

873. Lavin, G.E., Northrop, J.H., Taylor, H.S.
The low temperature absorption spectrum of pepsin. J. Am. Chem. Soc., 55:3497-3498, 1933.
The λ2600 - 2900 Å band of pepsin has been dissolved into a number of sharp, narrow bands at - 100° C. Resolution of absorption bands of serum albumin, egg albumin have been obtained at lower temperature. An interesting absorption cell is described.
F,a; H,a; I,1,2,4; (2).

874. Lehmann, E.
Über katalytische Lichtwirkung bei der Samenkeimung. Biochem. Ztschr., 50:388-392, 1913.
F,b; I,4; (6).

875. Luers, H. and Loerinser, P.
Über die Hitze- und Strahlungsinaktivierung der Malzamylase. Biochem. Ztschr., 144:212-218, 1924.
Effect of light from mercury-vapor lamp was compared with effect of heat on amylase.
I,4; (3).

876. Macht, D.I.
The influence of polarized light on the action of some ferments: A contribution of photo-pharmacology. Proc. Soc. Exper. Biol. & Med., 22:473-474, 1925.
Effect of polarized light on taka diastase; enzyme more active under polarized light.
I,4; IV,1; (3).

877. Mardaschew, S. and Mogilewsky, M.
Der Einfluss der mitogenetischen Strahlen auf fermentative Prozesse. Biochem. Ztschr., 265:429-436, 1933.
Chemical system (enzyme + substrate) can be used as detector of mitogenetic rays. Effect expresses itself in depression. Light, temperature, and pH of the system have no effects.
II,5; (3).

878. Morgulis, S.
Inactivation of catalase by ultraviolet radiation. Am. J. Physiol., 90:455, 1929.
Report of a paper. See articles for abstract.
I,4; (3).

879. Morgulis, S.
Studies on the inactivation of catalase. II. Inactivation of ultraviolet radiation at different hydrogen ion concentrations. J.Biol. Chem., 86:75-85, 1930.
See article in Biochem. Ztschr.
I,4; (6).

880. Morgulis, S.
Über die Inaktivierung der Katalase durch Ultraviolettbestrahlung beiverschiedenen Wasserstoffionenkonzentrationen. Biochem. Ztschr., 221:29-32, 1930.
At p^H 6 to 8 the inactivation of catalase by ultra-violet light is a function of irradiation time. Author believes to have obtained different results from Pincussen.
I,4; (3).

881. Narayanamurti, Duraiswami and coworkers.
Irradiation of Dolichos tyrosinase. Biochem. J. 24:1655-1658, 1930.
Tyrosinase was activated by irradiation with mercury lamp.
I,4; (6).

882. Norris, R. J.
An application of filtered ultra-violet radiation to sterilization of diastatic enzyme solutions. Bull. Basic Sc. Research, 2:93-104, 1928.
"The sensitivities of bacteria and a diastatic enzyme to various portions of the ultra-violet spectrum have been studied and found to be closely similar qualitatively but to have marked differences quantitatively in the same spectral region."
G,c; I,4; (3).

883. Oppenheimer, C.
Die Fermente und ihre Wirkungen, F.C.W. Vogel. IV. Aufl. Leipzig. 1913.
In Vol. I, page 62, special attention is paid to the effect of visible light on several enzymes.
I,4; (4).

884. Oppenheimer, C.
Die Krisis in der Zellatmung Problems und Lösungen. Deutsche. med. Wchuschi., I:578-580, 1933.
Interesting discussion of controversy between Warburg and Wieland about cell respiration.
A,b; H,c; I,1,2; (3).

885. Ostwald, W.
Über das Vorkommen von oxydativen Fermenten in den reifen Geschlechtsteilen von Amphibien und über die Rolle dieses Fermentes bei den Vorgängen der Entwicklungserregung. Biochem. Ztschi., 6:409-472, 1907.
Occurrence of two oxidation enzymes, guajac peroxidase and catalase, described. Their preparation discussed. Some effects of light given.
I,4; (6).

886. Overbeek, J. van
Wachsstoff, Lichtwachstumsreaktion und Phototropismus bei Raphanus. Recueil des Travaux botaniques néerlandais, 30:537-626, 1933.
E,b; I,4; (2).

887. Pace, J.
Über die Wirkung von ultraviolettem und sichtbarem Licht auf durch Erhitzen (teilweise oder völlig) inaktivierte Lösungen von Trypsin, Enterokinase und Trypsinkinase. Biochem. Ztschr, 240:490-493, 1931.
Solutions of trypsin and enterokinase or trypsinkinase partly inactivated by heat were still more inactivated by light above λ 2800 Å. Visible light has no measurable effect on these enzymes.
I,4; F,a; (3).

888. Palladin, W.
Die Arbeit der Atmungsenzyme der Pflanzen unter verschiedenen Verhältnissen. Ztschr.f. physiol. Chem., 47:407-451, 1906.
Effects of light on enzymes of plants.
E,b; I,4; (5).

889. Peemöller, F. and Franke, H.
Die Einwirkung ultravioletter Strahlen auf die Blutkatalase. Strahlentherapie, 21:165-170, 1926.
I,1,4; (6).

890. Petit, P.
Quelques observations sur l'amylase du malt. Compt. rend. Acad.d. sc., 161:39-40, 1915.
Effect of light on amylase with and without eosin.
I,1,4,5; II,2; (4).

891. Pincussen, L.
Fermente und Licht I. Diastase I. Biochem. Ztschr., 134:459-469, 1923.
Effect of light depends on dilution of enzyme (malt diastase). Light most effective when enzyme is most active.
I,4; (3).

892. Pincussen, L. and Kato, N.
Fermente und Licht II. Urease I. Biochem. Ztschr., 134:470-475, 1923.
Same effect as on diastase.
I,4; (6).

893. Pincussen, L. and Kato, N.
Fermente und Licht III.N.Kato, Urease II. Biochem. Ztschr., 142: 228-238, 1923.
Sunlight going through glass has detrimental influence on urease. Effects of KH_2, PO_4. Effect of quartz lamp alone described.
I,4; (6).

894. Pincussen, L. and di Renzo, F.
Fermente und Licht, IV. Francesco di Renzo, Diastase III. Biochem. Ztschr., 144:366-371, 1924.
Mechanism of destruction of diastase in presence of ultra-violet. Not very clear.
I,4; (6).

895. Pincussen, L.
Fermente und Licht V. Diastase IV. Biochem. Ztschr., 144:372-378, 1924.
Diastase from different sources behaves differently in ultra-violet.
I,4; (6).

896. Pincussen, L.
Fermente und Licht VI. Über die Beeinflussung von Fermentwirkungen durch Jodsalze unter Bestrahlung. I. Biochem. Ztschr., 152:406-415, 1924.
Article on effect of mercury light on diastase in presence of iodine.
I,1,4,5; II,2; (3).

897. Pincussen, L. and Klissinnis, N.
Fermente und Licht VII. Über Beeinflussung von Fermentwirkungen durch Jodsalze unter Bestrahlung. II. N. Klissinnis. Biochem. Ztschr., 152: 416-419, 1924.
Pancreatin irradiated with mercury lamp in presence of iodine salts is much more light resistant than if irradiated in presence of other salts.
I,4,5; II,2; (3)

898. Pincussen, L.
Fermente und Licht. VIII. Franz Seligsohn, Katalase I. Biochem. Ztschr. 168:457-463, 1926.
Blood catalase in impure condition follows same rule found for other enzymes. The more diluted the suspension the more intensive the effect. Effect highest at point of maximum activity. Addition of salt decreases effect of light. Iodine freed by light weakens the enzyme.
I,4; (6).

899. Pincussen, L.
Fermente und Licht IX. Diastase IV. Biochem. Ztschr., 171:1-6, 1926.
Diastase inactivated by mercury light partly reactivated by addition of non-irradiated diastase.
I,1,4; (3).

900. Pincussen, L. and Kumanomidoh, S.
Fermente und Licht X. S. Kumanomidoh. Diastase V. Biochem. Ztschr., 195:79-86, 1928.
Effect of light on enzymes depends also on dispersion of proteins in suspension. Since effect of heat depends in a certain way on dispersion, heat and light effects compared. Several type salts added to the suspension and it was found that decrease of activity of enzyme depends on the salt.
I,4; (3).

901. Pincussen, L., and Uehara, K.
Fermente und Licht. XI. Pepsin I. Biochem. Ztschr., 195:87-95, 1928.
Effect of light on enzyme investigated for dependence on different pH and different substrata.
I,4; (3).

902. Pincussen, L., and Hayashi, S.
Fermente und Licht. XII. Lipase I. Biochem. Ztschr., 195:196-102, 1928.
Lipase and esterase activity easily destroyed by light. Effect of light emphasized if enzymes are kept on acid side. Does not correspond to facts found about other enzymes.
I,4; (3).

903. Pincussen, L., and Kambayashi, J.
Fermente und Licht. XIII. Die Wirkung des Lichtes auf Takadiastase bei Zusatz von Sansibilisatoren. Biochem. Ztschr., 203:334-342, 1928.
Water cooled diastase in ultra-violet under influence of concentrated sensibilizer did not show increased destruction.
I,1,4,5; (3).

904. Pincussen, L., and Oya, T.
Fermente und Licht. XIV. Versuche über den Einflus der Temperatur bei der Lichtwirkung. Biochem. Ztschr., 207:410-415, 1929.
Radiation and heat given side by side to an enzyme, affect enzyme so that no reactivation of it possible.
I,4; (3).

905. Pincussen, L., and Oya, T.
Fermente und Licht. XV. Über die Spaltung des Lecithins durch die lecithase und Phosphatase des Präparates "Takadiastase." Biochem. Ztschr., 215:366-371, 1929.
Phosphatase inactivated quicker than lecithase in takadiastase when irradiated by light from mercury lamp.
I,4; (3).

906. Pincussen, L., and Oya, T.
Fermente und Licht. XVI. Über das pH-Optimum der Milchaldehydrase und die Beeinflussung dieses Fermentes durch Licht. Biochem. Ztschr., 215: 398-401, 1929.

Optimal pH of aldehydrase of milk is 7.35. Radiation in presence of oxygen weakens enzyme.
I,4; (3).

907. Pincussen, L., and Roman, W.
Fermente und Licht. XVII. (a). Über den Einfluss des sichtbaren und ultravioletten Lichts auf die Succinodehydrogenase des Pferdemuskelfleisches. Biochem. Ztschr., 229:281-290, 1930.
Roman finds, like others, that the effect of succinodehydrogenase on the reflex system, is strongest at a pH - 6.9. Another maximum has been found at 7.7. Fifteen minutes radiation with ultra-violet damages the enzyme to the same extent as one hour irradiation with visible light. One-half hour irradiation with visible light seems to activate the enzyme. The last point, however, is not certain.
I,4; F,c; (3).

908. Pincussen, L., and Hammerich, T.
Fermente und Licht. XVII. (b) Über Tyrosinase. Biochem. Ztschr., 239: 273-289, 1931.
Tyrosinase easily damaged in activity by irradiation with ultra-violet, independent of two substrata used.
Effect of light on skin could not be caused by formation of "melanine" in the skin.
I,4; (3).

909. Pincussen, L., and Hammerich, T.
Fermente und Licht. XVIII. Über Tyrosinase. Biochem. Ztschr., 239:273-289, 1931.
Tyrosinase easily destroyed by light of quartz mercury vapor lamp.
I,4; (6).

910. Pincussen, L., and Hammerich, T.
Fermente und Licht. XIX. Über Peroxydase. Biochem. Ztschr., 241:384-391, 1931.
Peroxydase of horse radish is damaged by the light of a mercury lamp; pH influences the effect of ultra-violet only very little, mostly on the acid side. Decrease of activity is roughly proportional to the intensity of the light.
I,4; (3).

911. Pincussen, L.
Über den Einfluss der Reinigung von Fermenten auf ihre Empfindlichkeit gegenüber der Strahlung. Fermentforsch, 8:181-186, 1925.
Qualitative test of effect of impurities on influence of light on enzymes.
I,4; (6).

912. Pincussen, L.
Über Veränderungen des Fermentgehaltes des Blutes. III. Die Beeinflussung der Katalase durch Strahlung. Biochem. Ztschr., 168:474-480, 1926.
Animals exposed to sunlight in Davos and in laboratory to mercury lamp. Changes of catalase in blood studied. Very general article.
A,b; I,4; (6).

913. Revoltella, G.
Über eine Vereinfachung in der Herstellung eines Ureasetrockenferments, dessen Wirksamkeit und Eigenschaften. Biochem. Ztschr., 134:336-348, 1923.
Effect of sunlight on urease.
I,1,4; (6).

914. Schmidt-Nielsen, S.
Die Enzyme, namentlich das Chymosin, Chymosinogen und Antichymosin, in ihrem Verhalten zu konzentriertem elektrischem Lichte. Hofmeister, Chem. Physiol. Path. 5:355-376, 1904.
Chymosin, chymosinogen, and antibodies of blood serum easily affected by concentrated electric light.
A,c; F,a; G,b; I,4; (5).

915. Schmidt-Nielsen, S.
Die Wirkungen des konzentrierten elektrischen Bogenlichtes auf Chymosin, Chimosinogen und Antichimosin. Mitt. Fins. med. Lysinst., 9:199-232, 1905.
The effect of light on Rennet solutions.
A,c; F,a; G,b; I,4; (5).

916. Schmidt-Nielsen, S.
Einige Erfahrungen, über die Verwendbarkeit des Lichtes als Reagenz. Mitt. Fins. med. Lysinst., 10:110-127, 1906.
The effect of light on Rennet solutions.
I,4; (5).

917. Schmidt-Nielsen, S.
Quantitative Versuche über die Destruktion des Labs durch Licht. Ztschr. f.d. ges. physiol. Chem., 58:233-254, 1908.
96% of total effect of mercury vapor lamp in destruction of lab enzyme produced by λ2000-2500 Å. 4% by 2500-3130 Å and about 0.3% by visible light. Material can be sensibilized not only for the visible but also for ultra-violet. Temperature coefficient is low.
I,1,2,4; (5).

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A,b; E,b; I,1,2,4,5; II,2; (2).

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I,4; (3).

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Effect of different colored light on cataclase. Red light conserves the activity while blue light decreases the activity of the enzyme.
I,4; (3).

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G,f; I,4,5; II,2; (4),(5).

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Studies on crystalline urease. Inactivation by ultra-violet radiation, sunlight with the aid of a photodynamic agent, and inactivation by trypsin. J. Biol.Chem. 87:625-628, 1930.
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I,4,5; II,2; (3).

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I,4; (3).

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Amylase in solution inactivated by radiations from mercury arc in quartz.
I,4; (6).

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I,4; (6).

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Über die fermentative Hydroperoxydzersetzung. II. Ztschr. f. physiol. Chem. 76:177-213, 1912.
Effect of light, especially ultra-violet on catalase is more pronounced in alkali than in neutral or acid solution.
I,4; (3).

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The role played by iron in the nature of respiration enzyme.
I,1,2,4; (2).

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Über die Wirkung von Kohlenoxyd und Stickoxyd auf Atmung und Gärung. Biochem. Ztschr., 189:354-380, 1927.
Respiration and fermentation related in their chemical mechanism. Fermentation enzyme does react like respiration enzyme with NO but not with CO.
I,2; VII, A,b; G,c; (2).

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Review.
F,b; I,1,2,4; (4).

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Über die chemische Konstruktion des Atmungsferments. Naturwissensch., 16:345-350, 1928.
Review article on work of respiration enzyme.
F,b; I,1,2; (3).

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A,b; I,2; (2).

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Atmungsferment und Sauerstoffspeicher. Biochem. Ztschr., 214:4, 1929.
Discussion of relationship of respiration enzyme and oxygen storage.
A,b; I,2; (2).

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The application of the photochemical equivalent law to vital processes. Tr. Faraday Soc. 27:551-554, 1931.
Review of Warburg's work on photosynthesis and on respiratory enzymes.
E,a; F,b; I,1,2,4; (4).

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Good review of work on oxygen transferring enzymes.
F,b; I,4;(4); (1).

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Über das neue Oxydationsferment. Naturwissensch., 20:980-981, 1932.
Several details about the nature, method of separation of new oxydation-enzyme.
F,b; I,1,2; (2).

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Über ein neues Oxydationsferment und sein Absorptionsspektrum. Biochem. Ztschr., 254:438-458, 1932.
Describe new enzyme found in bottom yeast.
Detailed discussion of properties of this new oxidation enzyme.
G,e; I,2; (2).

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Absorption spectrum of lactic acid bacillus Acidifans longissimus shows presence of yellow oxidation enzyme. Respiration of these bacteria is nothing but transfer of oxygen by respiration enzyme.
F,b; G,c; I,1,2; (2).

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Über das gelbe Oxydationsferment. Biochem. Ztschr., 263:228-229, 1933.
More products described which are formed from yellow oxidation enzyme.
I,2; VII; (2).

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Über das gelbe Ferment und seine Wirkungen. Biochem. Ztschr., 266: 377-411, 1933.
Yellow enzyme consists of colloidal carrier and "effective group," reversible yellow pigment. Pigment has also been called "flavin" or "Lyochrom." Material discussed under following headings:
1. Yellow pigment from yeast; 2. Pigment components of enzyme; 3. Occurrence of yellow pigment; 4. Effects of yellow pigment; 5. Co-enzymes; 6. Intermediate enzymes.
F,b; G,e; I,1,2; (2).

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Über Atmungsferment im Serum erstickter Tiere. Biochem. Ztschr., 214:107-109, 1929.
When animals suffocate, respiration enzyme goes from cell into the blood. Blood of suffocated animals shows distinct respiration.
A,b; VII; I,2; (1).

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Über die katalytische Wirkung von Methylenblau in Lebenden Zellen. Biochem. Ztschr., 227:245-271, 1930.
Catalytic action of methylene blue on living cells discussed under following headings: 1. Methods. 2. Effect of methylene blue and use of O_2 and glucose. 3. Respiratory quotient of methylene blue catalysis. 4. Isolation and determination of pyreracemic acid. 5. Straightening out of calculations. 6. Arresting of methylene blue catalysis with narcotics. 7. Arresting of methylene blue catalysis with CO. 8. Effect of HCN. 9. Methaemoglobin through methylene blue. 10. Equating of methaemoglobin formalin and methylene blue. 11. Form of haemoglobin from methaemoglobin through carbohydrate. 12. Carbohydrate combustion through methaemoglobin. 13. Mechanism of methylene blue catalysis.
A,b; F,b; I,5,2; VII; (1).

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Über die Verteilung des Atmungsferments zwischen Kohlonexyd and Sauerstoff. Biochem. Ztschr., 193:334-338. 1928.
Law of distribution of respiration-enzyme between CO and O_2 depends on temperature and possibly in small degree on salt content of suspension liquid.
A,b; G,c; I,1,2; (2).

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Über den Einfluss der Wellenlänge auf die Verteilung des Atmungsferments. (Absorptionsspektrum les Atmungsferments). Biochem. Ztschr., 193:339-346, 1928.
The effect of the wave-length in the distribution of the respiration enzyme
A,b; H,a; I,1,2,4; (1).

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Über die photochemische Dissoziation bei intermittierenden Belichtung und das absolute absorptionsspektrum des Atmungsferments. Biochem. Ztschr., 202:202-228, 1928.
Method given for determination of absolute absorption spectrum of respiration enzyme. Article of great importance for technique as well as results.
A,b; H,a; I,2,4; (1).

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Absolutes Absorptionsspektrum des Atmungsferments. Biochem. Ztschr., 204:495-499, 1929.
Through error in bolometer, the absorption energy values given in article in Naturwissensch., 16:202, 1928, were given too low. Corrected values stated here.
A,g; I,2; (3).

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Über das Absorptionsspektrum des Atmungsferment. Biochem. Ztschr., 214:64-100, 1929.
"Classical" paper for technique as well as material. Absorption spectrum for λ 2540-6000 A determined through effectivity curve.
A,b; H,a; I,1,2;(1).

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Über das Absorptionsspektrum des Atmungsferments der Netzhaut. Biochem. Ztschr., 214:101-106, 1929.
Respiration enzyme of animals carrying haemoglobin just as closely related to haemoglobin as respiration enzyme of yeast.
A,b; F,b; I,2; VII; (2).

948. Warburg, O. and Negelein, E.
Über das Hämin des sauerstoffübertragenden Ferments der Atmung, über einige künstliche Hämoglobine und über Spirographi-Porphyrin. Biochem. Ztschr., 244:9-32, 1932.
Article contains: Haemins and their compound formation with globin. Changes of phaeohaemin b and spirographishaemin. Reversible attaching of oxygen to rhodohaemoglobin, diacetyl-deutero-haemoglobin and phaeohaemoglobin b.
Spectrum of phaeohaemoglobin b and its CO-compound.
" " "spirographishaemoglobin and its CO-compound.
" " "chlorocruorins and its CO-compound.
A,b; E,b; I,2; (2).

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Direkter spektroskopischer Nachweis des sauerstoffübertragenden Ferments in Essigbakterien. Biochem. Ztschr., 262:237-238, 1933.
Presence of absorption band of the oxygen carrying enzyme in suspension of vinegar bacteria observed with small spectroscope.
B; G,c; I,2; (2).

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Spirographishämin. Biochem. Ztschr., 227:171-183, 1930.
Preparation and properties of spirographishaemin and relation to respiration enzyme.
F,b; I,2; (2).

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Spektroskopischer Nachweis des sauerstoffübertragenden Ferments neben Cytochrom. Biochem. Ztschr., 266:1-8, 1933.
F,b; I,1,2; (2).

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Études sur les enzymes protéalytiques de l'orge en germination (du malt). Compt-Rendus des Travaux due Labor. Carlsberg, (dän.) 5:135-285, 1903.
Discussion of chemistry of certain enzymes.
VII; (4).

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Charakteristische Eigenschaften der Fermente bei der Spaltung von optischaktiven Körpern. Klin. Wchusshr., 10:2314-2316, 1931.
All enzymes possess stereochemical specificity. General review.
IV, I: (4).

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Über die Katalase und ihre Rolle im Reaktionsmechanismus der Photosynthese. Acta phytochim. (Tokyo), 7:93-115, 1933.
E,b; I,4; (3).

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Über die aktive Gruppe der Katalase. II. Ztschr. f. physiol. Chem., 195:39-48, 1931.
Additional experiments show that porphyrin-bound iron is the carrier of enzyme activity. Liver catalase and pumpkin catalase have the same absorption bands.
E,b; F,b; I,1,2; (2).

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Häminhaltige Fermente. Ergebn. d. Physiol., 35:498-537, 1933.
Review of haemin containing enzymes under following headings: Chemistry and names of haemin compounds. Oxygen transferring enzyme of respiration. Cytochrome. Katalase. Peroxydase. Statistical. Discussion of mechanisms. (165 references).
H,b; I,1,2,4; (4).

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Über die aktive Gruppe der Leber Katalase. Ztschr. f. physiol. Chem., 192:171-192, 1930.
A porphyrin iron complex with a typical absorption spectrum was found in horse liver extract. It is thought that this is the active part of the enzyme catalase activity. With HCN and H_2S it gives compounds which are easily dissociated.
A,f; I,1,2; (2).

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Die Sensibilisierung der Katalase. Biochem. Ztschr., 8:84-97, 1908.
Peroxydase and katalase sensitive to ultra-violet and visible light. Visible light active only if oxygen is present while ultra-violet is active without oxygen. Photodynamic substances speed up inactivation in visible light.
I,4,5; II,2; (3).

See also:

123, 181, 182, 202, 231, 248, 274, 484, 689, 765, 949, 1027,
1028, 1030, 1164, 1182, 1219, 1222, 1271, 1329, 1377, 1396, 1505, 1555,
1573, 1623, 1729, 1768, 1864, 1975, 2000, 2002, 2089, 2135, 2228, 2248,

2280, 2335, 2437, 2497, 2684, 3172, 3226, 3228, 3278, 3300, 3357.

C. VITAMINS

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Crystalline Vitamin D. Proc. Roy. Soc., London, B., 109:488-506, 1932.
I,1,2; (3).

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Ultra-violet light and vitamin D in nutrition. Univ. Chic. Press, Chicago, 1930. 229 p.
I,1,2,4; (4).

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The absorption spectrum of vitamin D. Proc. Roy. Soc. London B, 104:561-583, 1929.
The action of ultra-violet radiation on ergosterol has been studied by comparing the absorption spectra and antirachitic activity of the products formed.
I,1,2,4; (3).

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Absorption spectrum of vitamin A at low temperatures. Nature, 131:582-583, 1933.
Authors took absorption spectra of materials containing vitamin A at low temperatures (liquid hydrogen) and were able to dissolve almost all absorption bands.
I,1,2,3,4; (2).

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The vitamines. Monogr. Pickett-Thompson Research Lab. Volume 1. 1931. 575 p.
Most extensive work on all vitamins with about 3600 references.
I,1,2,4; (1), (4).

964. Coward, K. H. and Dyer, F. J.
The determination of vitamin A in cod-liver oils, a) biologically, b) chemically, c) physically, with a statistical examination of the results. II. Further evidence that the intensity of absorption at 328 $\mu\mu$ gives the best agreement with the biological measure of vitamin A in cod-liver oils. Biochem. J., 26:1593-1600, 1932.
Apparently the absorption for λ 3280 Å gives the best values for the determination of vitamin A.
I,1,2; (3).

965. Daniels, F. and Fosbinder, R. J.
Ultraviolet light and the oxydation of cod liver oil. Science, 62:266, 1925.
The effects produced by irradiated cod liver oil on the photographic plate are not radiation but chemical effects.
I,4; (3).

966. Dann, W. J.
The relative velocities of the photochemical reactions of carotene and vitamin A with radiation of wave length 2650 Å. Biochem. J., 27:274-278, 1933.
Vitamin A is more rapidly destroyed than carotene by radiation of wave length 2650 Å. Author believes that the possibility that vitamin A is the end-product of the photochemical reaction of carotene with this radiation is precluded.
I,1,2,4; (3).

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Absorption spectra in relation to the constituents of fish oils. Biochem. J., 27:1451-1460, 1933.
Possible explanations of the absorption spectrum of liver oils.
F,c; I,1,2,4; (3).

968. Euler, H. v.
Über das Wachstum von Mikroorganismen auf bestrahlten lipoidhaltigen Nährböden. I. Biochem. Ztschr., 165:23-28, 1925.
In the study of vitamin A the medium on which the microorganism should be grown is exposed to the quartz-mercury-vapor lamp. Different changes in the subsequent growth of the organisms.
G,c; I,4; (3).

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Die biochemischen und physiologischen Wirkungen von Carotin und Vitamin A. Ergebn. d. Physiol., 34:360-405, 1932.
Good review of Vitamin A work. 208 references.
I,1,2,4; (1), (4).

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Spectrographic data of natural fats and their fatty acids in relation to vitamin A. Biochem. J., 25:30-38, 1931.
Record of evidence showing that fatty acids or esters prepared, therefrom produced in the ordinary hydrolysis of vitamin A containing liver oils, or of some other fatty oils from animals whose liver oils contain vitamin A, yield highly characteristic bands and absorption spectra which are absent from corresponding acids of vitamin A free oils. Excellent absorption spectra of fats and fatty acids.
F,c; I,1,2,4; (2).

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Die neuere Richtung der experimentellen Rachitisforschung. Ergebn. d. allg. Path. u. path. Anat. vol 25, 58-491, 1931.
Has 2723 references. Most extensive volume on rickets and vitamin D.
I,1,2,4; (1), (4).

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Zur Photoaktivierung des Lebertrans. Klin. Wchnschr., 5:2119-2120, 1926.
See later papers on same subject.
I,4; II,2; (3).

973. Harris, L. J.
Vitamins. Annual Rev. Biochem., 3:247-294, 1934.
Up-to-date review. Large literature list.
I,1,2,4; (4).

974. Heilbron, J. M., Baly, E. C. C. and Stewart A. W.
Absorption spectra and chemical constitution of organic compounds. Report Brit. Assoc. Comm. Burling. House, W.1. 22pp.
Good review on absorption spectra. Special reference to vitamine work.
F,c; I,1,2; (4).

975. Heilbron, I. M. and Morton, R. A.
Photochemistry of vitamins. A, B, C, D. Nature, 129:866-867, 1932.
Interesting discussion of the absorption bands of the different vitamins as well as possible effects of light of different wave-lengths on them. Polemic with Bowden and Snow.
I,1,2,4; (2).

976. Heilbron, I. M. and Spring, F. S.
XVIII. The colour reactions and absorption spectra of sterols in relation to structure. Biochem. J., 24:133-135, 1930.
Selective absorption of sterols is conditioned by the presence of the two ethnoid linkages with molecule, one of which must apparently be in the $\Delta^{1:13}$ (or $\Delta^{1:2}$) position.
F,c; I,1,2; (3).

977. Heyroth, F. F. and Loofbourow, J. R.
The ultra-violet absorption spectra of certain vitamin B- containing preparations. Bull. Basic Sc. Research, 3:237-248, 1931.
"It is concluded that there is evidence to show the presence of purine or pyrimidine-containing compounds, or modifications thereof similar to those brought about by irradiation with ultra-violet, in vitamin B concentrates.
I,1,2,4; (2).

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Ultra-violet absorption spectrum and chemical structure of vitamin B_1. Nature, London, 130:774, 1932.
Authors believe that there has as yet not been brought enough proof that the λ 2600 Å absorption band of Vitamin B_1 preparation is typical for this vitamin.
I,1,2,4; (2).

979. Heyroth, F. F. & Loofbourow, J. R.
Deduction as to the chemical constitution of vitamin B_1 from the absorption spectra of B_1 concentrates. Bull. Basic Sc. Research, 4:35-54, 1932.
From a comparison of the absorption spectra and the biological activities of eight vitamin B_1 concentrates it is concluded that biological inactive purines or pyrimidines account for a large part of the absorption of the less active concentrates; vitamin B_1 itself is characterized by an absorption maximum of λ 2600 Å; and vitamin B_1 is indicated by its spectrographic properties to be a pyramidine ring containing compound or a compound of the same type as ergothioneine. (Author's summary.)
F,c; I,1,2; (2).

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Irradiation of nucleic acids and uracil. Nature (London), I:92-93, 1933.
Ultra-violet irradiation of nucleic acid and uracil does not produce Vitamin G.
F,c; I,1,2,4; (3).

981. Hirsch, W. and Kellner, L.
Die Bedeutung des ultraroten Strahlenbereiches für den Rachitisschutzstoff. Strahlentherapie, 41:232-250, 1931.
Ergosterin was activated with ultra-violet and inactivated with infra-red. Changes were observed on the basis of absorption spectra. Temperature rises of 10° C. are sufficient to inactivate activated ergosterin. Infra-red caused the following changes: Increase of ultraviolet absorption at λ 2600-3000 Å. Increase of ultraviolet absorption at λ 2300-2400 Å, causing an increased activity of the material. Extensive literature on effect of infra-red.
F,c; I,2,4; (2).

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Das ultrarote Absorptionsspektrum von Ergosterin und Rachitisschutzstoff. Biochem. Ztschr., 235:162-169, 1933.
Detailed description of an infra-red automatic registering spectrophotometer.
The infra-red absorption spectra of ergosterin and rachitis-protector differ from each other. Ergosterin has only one band at λ 3.71 μ and rachitis-protector one at λ 3.71 μ and a weaker one at λ 0.976 μ. The total absorption of the rachitis-protector is larger than that of ergosterin.
F,a; I,2,4; (2).

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Die Photoaktivierung des Ergosterins zum antirachitischen Vitamin D. Strahlentherapie, 28:108-109, 1928.
Review of the early work on Vitamin D.
I,1,2,4; (6).

984. Kellner, B.
Die Veränderungen weisser Ratten bei Vergiftung mit bestrahlten Ergosterin. Virchows Arch. f. path. Anat., 288:491-526, 1933.
Detrimental effects of irradiated ergosterin. Large bibliography.
I,4; (3).

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Potency of Vitamin B Preparations. Nature 130:774, 1932.
More potent vitamin B_1 preparation produced from yeast.
VII; (6).

986. Kisch, E. and Reiter, T.
Über den Einfluss der Wellenlänge bei der Egosterinbestrahlung. Strahlentherapie, 39:452-468, 1931.
General vitamin D importance.
I,4; (6).

987. Kohl, F., Geffken, H. and Richter, H.
Das Vitaminproblem in der Rachitistherapie. Strahlentherapie, 23:706-710, 1926.
Very qualitative work.
I,1,2,4,5; II,2; (5).

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Zur Pathogenese der Avitaminosen. Klin. Wchnschr., 10:1841-1847, 1931.
Clinical article on effect of different diets on rachitis, and other pathological conditions.
I,1,4; VII; (6).

989. Loofbourow, J. R.
Vitamin D. - a review. Part 1. Ultraviolet absorption spectra in relation to vitamin D. activation. Section A. Early attempts to correlate absorption spectra and vitamin D. activation. Section B. Ergosterol as the true precursor of vitamin D. Bull. Basic Sc. Research 3:101-156, 1931.
I,1,2,4; (2), (4).

990. Loofbourow, J. R.
Vitamin D - a review. Part 1. Ultra-violet absorption spectra in relation to vitamin D. Section C. The ultra-violet absorption spectra of oils. Bull. of Basic Sc. Research 3:201-236, 1931.
F,c; I,1,2,4; (2), (4).

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Vitamin D. - a review. Part 1. Ultra-violet absorption spectra in relation to vitamin D. Section C. Ultra-violet absorption of oils. Bull. Basic Sc. Research 3:257-262, 1931.
I,1,2,4; (2), (4).

992. Loofbourow, J. R.
Vitamin D - a review. Part I. Ultra-violet absorption spectra in relation to vitamin D. Section D. changes in the absorption spectrum of ergosterol on irradiation. Bull. Basic Sc. Research 4:59-112, 1932.
I,1,2,4; (1), (4).

993. Ludwig, F. and Ries, J. v.
Die biologische Bedeutung der Rot- und Quarzlichtbestrahlung. Strahlentherapie, 29:581-591, 1928.
Antagonistic action of ultra-violet and infra-red light on vitamin D activation.
I,1,2,4; (3).

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Threshold values of ultraviolet radiations. Proc. Soc. Exper. Biol. & Med., 30:1379-1380 (1933).
Determination of lowest possible amount of ultra-violet which could produce antirachitic effects.
I,4; (6).

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Neuere Untersuchungen über Vitamin-D. Bildung durch Sonnenlicht. II e Congr. Int. Lum. Coph. 664-669, 1932.
The quantum efficiency of the different wavelengths around λ 3000 Å is discussed.
I,1,2,4; (3).

996. Norris, R. J.
The destruction of vitamin A by ultraviolet radiations. Bull- Basic Science Research, 3:89-100, 1931.
Destruction of biological activity by irradiation was found to proceed rapidly after an initial induction period in which there was very slight or no inactivation. Destruction of the chromogenic substance began immediately upon irradiation, without an induction period. The author concludes that the chromogenic substance is not vitamin A itself, but some substance closely associated with it. (Author).
I,1,2,4; (2).

997. Norris, R. J.
A comparison of the colorimetric, spectrographic, and biological methods for the determination of vitamin A. Bull. Basic Sc. Research 3:249-256, 1931.
It is concluded that biological tests are the only reliable method for the vitamin A assay of cod-liver oils at the present time.
I,1,2,4; (3).

998. Peters, R. A. and Philpot, J. St. L.
On the ultraviolet absorption of crystalline preparations of vitamin B. Proc. Roy. Soc., London, B 113:48-56, 1933.
Highly potent crystalline preparations of vitamin B, made by Kinnersley O'Brien and Peters show maximum ultra-violet absorption at λ 2450 λ 2490 Å. Substance present which shows marked changes in absorption upon making alkaline. Changes reversible. Appearance of the λ 2650 Å band discussed in detail.
I,1,2,4; (2).

999. Peters, R. A. and Sinclair, H.M.
Vitamin B and tissue oxidation. Arch. f. exper. Zellforsch., 15:59-60, 1934.
General physiological interest.
A,f; I,1,2; VII; (6).

1000. Pohl, R.
Zum optischen Nachweis eines Vitamines. Naturwissensch., 15:433-438, 1927.
Absorption spectra of vitamin D and related substances.
I,1,2; (4).

1001. Rygh, O.
Über einige aus Ergosterin hergestellte Kohlenwasserstoffe. Ztschr. f. physiol. Chem., 185:99-104, 1929.
F,c; I,1,2,4; (3).

1002. Rygh, O.
Das Vitamin C. Ergebn. d. Physiol., 35:387-414, 1933.
Good review of work on Vitamin C.
H,c; I,1,2; (4).

1003. Schultz, F. and Laquer, F.
Bestrahltes Adeninsulfat und antineuritisches Vitamin B_1. Ztschr. f. physiol. Chem., 219:158-163, 1931.
Neither irradiated nor unirradiated adenin or its salts have any antineuritic effects.
I,1,4; (6).

1004. Seel, H. and Dannmeyer, F.
Über die Isolierung und die chemisch-physikalische Natur des antixerophthalmischen Vitamins "A". Strahlentherapie, 39:449-451, 1931.
I,1,2; (6).

1005. Setz, P.
Photochemische Umwandlungen der Bestrahlungsprodukte des Ergosterins. Ztschr. f. d. ges. exper. Med., 215:183-192, 1933.
Photochemical change takes place only in the direction:
Ergosterin → Lumisterin → Tachysokrin → Vitamin D_2 → Suprasterine.
Different radiation products possess different sensitivity to different wave lengths of ultra-violet.
I,4; (3).

1006. Shelow, E.
The near infra-red absorption spectra of ergosterol and irradiated ergosterol Bull. Basic Sc. Research, 3:175-200, 1931.
Absorption spectra of ergosterol and effect of light on ergosterol suggests vitamin D is an alcohol, isomeric with ergosterol.
F,c; I,1,2 4; (2).

1007. Shelow, E.
The near infra-red absorption spectrum of crystalline "calciferol" (Vitamin D) Physical Rev. 45:126, 1934.
General form of absorotion spectra curves of calciferol and ergosterol very similar, indicating isomeric relationship of two substances.
I,1,2; (2).

1008. Shelow, E. and Loofbourow, J. R.
The antirachitic activation of ergosterol by soft x-rays. Bull. Basic Sc. Research 3:47-70, 1931.
VI, 2; (2).

1009. Shelow, E. and Loofbourow, J. R.
A note on the x-ray absorption of ergosterol. Bull. Basic Sc. Research 3:157-159, 1931.
Corrected absorption curve for ergosterol.
F,c; VI,1; (3).

1010. Sonne, C. and Reckling, E.
Behandlung experimenteller Rattenrachitis mit monochromatschem ultravioletten Licht. Strahlentherapie, 25:552-558, 1927.
Light of λ 3000 Å to λ 2537 Å most effective.
A,f; I,1,4; (5).

1011. Suhrmann, R. and Kollath, W.
Bemerkung zu der Notiz von R. C. Gibbs, J.R. Johnson und C.V. Shapiro: Das Absorptionsspektrum des Blutes und seine Beziehung zur Rachitis. Naturwissensch. 19:65-66, 1931.
Polemic against Gibbs, Johnson and Shapiro.
I,1,2,4; (5).

1012. Szent-Györgyi, A.
Non enzymic catalysts of cellular oxidation. Arch. f. exper. Zellforsch. 15:29-39, 1934.
Interesting discussion of possible function of cytochrome, catecholquinol, cytoflave, glutathion and ascorbic acid (Vitamin C) in cellular oxydation.
F,b; I,1,2; VII; (1), (4).

1013. Verzar, F.
Vitamine und innere Sekretion. Schweiz med. Wchnschr., 13:57-60, 1932.
Review of work on the relation of vitamines and internal secretion.
I,4; (4).

1014. Vines, H. W. C.
The action of ultra-violet light, thyroid and parathyroid substances upon an artificial plasma in vitro. Endocrinology 11:125-135, 1927.
Ultra-violet exerts its action through the cholesterol fats in the solution.
F,a; I,4; (6).

1015. Vollmer, H.
Photoaktivitätsstudien. I. Einwirkung verschiedener Vitaminträger, besonders der Lebertrans, auf die photographische Platte. Biochem. Ztschr., 172:467-482, 1926.
After having been exposed to ultra-violet, a very large number of biological materials leave impressions on photographic plate. (Plate not protected against vapors. See Stritetski's article.)
I,4; (6).

1016. Vollmer, H.
Beziehungen zwischen photographischer und antirachitischer Wirkung. Klin. Wchnschr., 6:17-19, 1927.
There is no relation between antirachitic effect and action of the irradiated substance on the photographic plate. Effect on the plate is definitely no radiation effect.
I,4; II,1; (6).

1017. Vollmer, H. and Serebrijski, J.
Photoaktivitätsstudien. V. Mitteilung. Die Beziehungen zwischen photographischen und antirachitischer Wirksamkeit. Biochem. Ztschr., 176:84-91, 1926.
Relation of photographic and antirachitic effects.
I,4,5; II,2; (6).

1018. Windaus, A., Dithmar, K. and Fernholz, E.
Über das Lumisterin. Liebigs Ann., 493:259-271, 1932.
Structure of lumesterin a compound appearing in Vitamine D preparations investigated. Absorption spectra of lumesterin and its derivatives.
F,c; I,1,2; (2).

1019. Windaus, A., Linsert, O., Lüttringhaus, A. and Weidlich, G.
Über das krystallisierte Vitamin D_2 Ann. der Chemie 492:226-241, 1932.
Production and work on the structure of vitamin D_2.
I,1,2; (2).

1020. Windaus, A. Lüttringhaus, A. and Deppe, M.
Über das krystallisierte Vitamin D. Ann. der Chemie 489:252-269, 1931.
Production of crystalline Vitamin D_1.
I,1,2,4; (1).

1021. Winterstein, A.
Über ein neues Provitamin A. Ztschr. f. physiol. Chem., 215:51-58, 1933.
Compound in hexane has absorption bands at λ 5000, 4500 and 4400 Å.
I,1,2; (2).

1022. Wissink, G. M.
A magneto-optic method of determining the vitamin content of various substances. Physics, 5:31-34, 1934.
Magneto-optical method can be used for determination of vitamin-content of biological materials. Photoelectric cell used for determination of minimum. Minimum of 32.9 seems to indicate presence of vitamin A. Pure carotene in alcohol or water solution does not give minimum of 32.9 except irradiation with ultra-violet..
I,1; V,1; (2).

1023. Wissink, G. M. and Woodrow, J. W.
The detection of Vitamin A. by means of the magneto-optic method. Physical Rev. 45:126, 1934.
All materials containing vitamin A. have a minimum at 392. Those materials without Vitamin A did not show this minimum.
V,1; (2).

See also:

79, 92, 123, 159, 260, 261, 272, 505, 664, 667, 749, 1050, 1057, 1067, 1362, 1585, 1633, 1694, 1774, 1853, 1901, 2017, 2042, 2240, 2592, 3074, 3228.

D. HORMONES

1024. Abderhalden, E. and Rossmer, E.
Spektrophotometrische Vergleichung von natürlichem Tyroxin mit synthetisch dargestelltem. Ztschr. f. physiol. Chem., 169:223-225, 1927.
The spectrophotometric comparison of natural and synthetic thyroxin would indicate the identity of these compounds.
F,a; I,1,2; (3).

1025. Allen, E. and Ellis, M. M.
The effect of ultraviolet rays on the hormone of the ovarian follicle and placenta. J. A. M. A., 85:94-95, 1925.
The hormones exposed to the light of the quartz-mercury-vapor lamp are destroyed after long exposures, probably by oxydation.
I,4; (3).

1026. Baldes, E. J. and Adams, S. F.
Spectrophotometric analysis of commercial insulin. Am. J. Physiol., 74:309-313, 1925.
Commercial preparations of insulin and insulin prepared in Mayo's laboratory show no absorption bands in the visible.
Some yellow pigment may, if it appears uniformly in all insulin preparations, be an indication of percentage of insulin present.
I,1,2; (3).

1027. Burge, W. E.
The destruction of hormones, pro-enzymes, and enzymes by ultraviolet radiation. Proc. Am. Physiol. Soc., Am. J. Physiol., 40:137-138, 1916.

Short abstract of a paper. Adrenaline, secretine, proenzymes and enzymes were destroyed by light of quartz-mercury-vapor lamp.
B; I,4; (3).

1028. Burge, W. E., Fischer, W. R. and Neill, A. J.
The destruction of hormones, proenzymes and enzymes by ultra-violet radiation. Am. J. Physiol., 40:426-432, 1916.
The following enzymes and proenzymes hormones were exposed to the light from a quartz-mercury-vapor lamp in a quartz-covered, water-cooled vessel: adrenalin, trypsin, trypsinogen, pepsin, enterokinase, ptyalin, amylopsin. All materials were destroyed by ultra-violet. Rate of destruction is proportional to the amount of energy applied.
B; I,4; (3).

1029. Butenandt, A.
Über physikalische und chemische Eigenschaften des krystallisierten Follikelhormons. Untersuchungen über das weibliche Sexualhormon. (5. Mitt.). Ztschr. f. physiol. Chem., 191:140-156, 1930.
Optical rotation and absorption-spectrum of the follicular hormone. Absorption band is at λ 2800-2850 Å.
I,1,2; IV,1; (2).

1030. Delezeune, C. and Lisbonné, M.
Action des rayons ultraviolets sur le suc pancréatique. Leur influence sur l'activation du suc par la kinase et par les sels de calcium. Compt. rend. Acad. d. sc., 155:788-790, 1912.
The effect of light from a quartz-mercury-vapor lamp on a number of enzymes is discussed.
B; I,4; (5).

1031. Den Hoed, D., de Jongh, S. E., and Peek, A. E. J.
Über das Verhalten von Insulin gegenüber Röntgen-, Radium-, und ultraviolletten Strahlen. Biochem. Ztschr., 205:144-153, 1929.
Insulin is not destroyed by light from the quartz-mercury-vapor lamp, but slightly activated.
I,4; (3).

1032. Dingemanse, E., Kober, S., Reerink, E. H., and Wijk, A. van
Absorptionsspektrum von Menformonkristallisaten verschiedener Herkunft. Biochem. Ztschr., 240:265, 1931.
It is shown that the crystallized menformon from the urine of the horse and the urine of pregnant women has the identical absorption at λ 2800 Å.
A,d; I,1,2; (3).

1033. Editorial
Ultra-violet light, insulin, and aminoacid catalysis. Proc. Staff Meet., Mayo Clin., 3:93-94, 1928.
Review of Ort's work.
F,a; I,1,2,4; (4).

1034. Ellis, M. M. and Newton, E. B.
Changes in the physiological action of insulin induced by exposures to ultraviolet light. Am. J. Physiol., 73:530-538, 1925.
Insulin exposed in N atmosphere in transparent fused quartz to mercury lamp at 4 inches, air-cooled, lost its power of reactivity to produce hypoglycemia in 19-48 hours.
Apparently some substance was produced which gave hyperglycemia. Material in pyrex tubes did not lose its reactivity. Ozone did <u>not</u> produce hyperglycemic substances in insulin, but it destroyed hypoglycemia. A possible activating action of the ultra-violet is discussed.
I,1,4; (3).

1035. Escher, H. E.
Über den Farbstoff des Corpus luteum. Ztschr. f. physiol. Chem., 83:198-211, 1913.
Investigation of the presence of carotin in the corpus luteum.
A,f; I,1,2; (3).

1036. Euler, U. S. v.
Spektrophotometrische Adrenalinbestimmung in Nebennierenextrakten. Biochem. Ztschr., 260:18-25, 1933.
Author uses a Pulfrich spectrophotometer only for the determination of the indicator color.
F,b; I,1,2; (6).

1037. Fellenberg, T. v.
Ultraviolettes Licht und Kropf. Biochem. Ztschr., 235:205-213, 1931.
Article of general physiological interest.
A,f; I,4; (3).

1038. Graubner, W.
Quantitative spektrographische Untersuchungen im ultravioletten Teil des Spektrum. I. Die Hormone und ihr spektrographisches Verhalten. Ztschr. f. ges. exper. Med., 63:527-541, 1928.
Article gives a detailed description of the Scheibe method of taking absorption spectra. Steric differences have but little influence on absorption spectra. Thyreophorin, thyreoidea, thyreoglandol, thyreoidin show no band but general absorption. Maximum absorption: thyroxin (synthetic): 3250 Å; gynergen (synthetic): 3170 Å; adrenalin (pure d-form synthetic): 2800 Å, insulin: 2720-2750 Å; hypophysin: 2650-2670 Å; ephedrin: 2470 Å.
Insulin all preparations have bands between 2450-2850 Å. Also insulin powder has this band. Hypophysin preparation can be tested for purity by this method. Folliculin gave the usual end absorption. Argotamin and ephedrin, also eppedrin gave constant absorption bands. Histamin, guanidin, creatin, anlin, diphtheria poison, tuberculin, digipurat, strophanthin, atropine are optically empty.
Absorption is caused by unsaturated bands. Mixed hormones: adrenalin-thyroxin, adrenalin-insulin, thyroxin-insulin, thyroxin-hypophysin, adrenalin-hypophysin. A two-headed band as one would expect has not been found. There was usually a displacement toward the red and band became less clear. Important paper.
F,a; H,a; I,1,2; (2).

1039. Haberlandt, L.
Über ein Hormon der Herzbewegung. VIII. Mitl. Bestrahlungsversuche mit Fluorescenz, Ultraviolett und Röntgenlicht. Arch. f. d. ges. Physiol. 218:129-136, 1927.
Heart hormones are destroyed by strong fluorescence and only partly by ultra-violet.
I,4; II,2; (6).

1040. Handowsky and Reuss
Eine exakte Methode zum Nachweis kleinster Adrenalinmengen. Arch. f. exper. Path. u. Pharmakol., 128:143-146, 1928.
Authors believe that the spectrophotometric method is more reliable than chemical methods in the estimation of adrenalin in biological materials. The band at λ 2800 Å is used. The estimates of adrenalin by the spectrophotometric method are higher than by the chemical method.
F,a; I,1,2; (3).

1041. Handovsky, H. and Reuss, A.
Über den quantitativen Adrenalinnachweis in Organen mit Hilfe lichtelektrisch ausgemessener Absorptionspektren. I. Über den Adrenalingehalt der Nebennieren. Arch. f. exper. Path. u. Pharmakol., 144:105-122, 1929.
The λ 2800 Å absorption band is well suited for the detection and quantitative determination of adrenalin.
I,1,2,4; (2).

1042. Hicks, C. S.
The relationship of Thyroxin to Tryptophane. J. Chem. Soc., 127:771-776, 1925.
Absorption spectra of thyroxin, tryptophand and related compounds.
F,a; I,1,2; (2).

1043. Huwer, G.
Spektrographische Harnuntersuchungen im ultravioletten Licht. Strahlentherapie, 46:393-396, 1933.
Human urine investigated. A prolan extraction was made following the description of Zondek. In some cases an absorption band at λ 2900 Å maximum and 2650 Å minimum was found. The other material had no maximum but only a flat part in the curve. The extinction coefficient was proportional to the specific weight of the material. Substance is soluble in water and alcohol, but not in ether. Serum without protein gave the same test. More detailed work promised.
A,c,d; I,1,2,3; (2).

1044. Ito, R. and Terada, B.
On the effect of radiation upon adrenalin. Jap. J. M. Sc. Tr. IV. Pharmacol. 5:65-66, 1930.
Optical rotation of adrenalin irradiated with mercury quartz lamp increased at first, then decreased. Efficiency of irradiated adrenalin studied.
I,4; IV,1; (3).

1045. Jordon, C. N. and Doisy, E. A.
The effect of light upon the follicular hormone. Proc. Soc. Exper. Biol. & Med., 24:216-218, 1926.
Destructive effect of sunlight on follicular hormone.
I,4; (3).

1046. Keeser, E.
Für die biologische Wirksamkeit verschiedener Lichtarten. Arch. f. exper. Path. u. Pharmakol., 166:624-633, 1932.
Effects of visible and infra-red light on insulin and adrenalin.
I,4; (3).

1047. Kneer, L., Orth, O. S., Verd, D. J., Burge, W. E.
Destruction of the depressor action of adrenalin by ultraviolet radiation. Endocrinology, 15:547-548, 1931.
Depressor action of adrenalin destroyed by irradiation with quartz-mercury-vapor lamp.
I,4; (6).

1048. Kögel, G.
Beiträge zur Lichtempfindlichkeit der Sexualhormone und des Chlorophylls. Strahlentherapie, 45:587-589, 1932.
Suggestion that resemblance in structure of blood pigments and chlorophyll must have some photochemical relation. Kögel also points out the light-sensitivity of follicular and testicular hormone. The O″ of the five numbered ring is most light sensitive.
E,a; I,1,4; (2).

1049. Koh, Munlyong
The relationship existing between hormone and non-specific cell activity, especially that between the influence of ultra-violet ray upon the erythrocytes and the hormones of the spleen and the thyroid. J. Chosen M. A., 22:53-54, 1932.
In Japanese.
A,b,f; I,4; (3).

1050. Kugelmass, F. N. and Mc Quarrie, I.
The photoactivity of substances curative of rickets and the photolysis of the oxyproducts by ultraviolet radiation. Science, 60:272-274, 1929.
Authors received impression on photographic plate from materials which had been exposed previously to ultraviolet light. (See Daniels).
C; I,4; (6).

1051. Küstner, H.
Die biologische Wirkung von Strahlen verschiedener Wellenlänge. Zentralbl. f. Gynäk., 55:2986-2992, 1931.
Rats and mice kept in red light gave very much higher percentage of effective Zondek-Aschheim tests than animals kept in blue, yellow or ultra-violet light. (No energy checks.)
A,f; I,4; (6).

1052. Küstner, H.
Hormonwirkung bei den Pflanzen und Hormonsteigerung durch rotes Licht. Klin. Wchnschr., 10:1585, 1931.
Seedlings watered with urine of pregnant women in presence of red light grow faster than those kept under smae conditions in blue or ultra-violet light. Urine of non-pregnant women did not have this effect.
A,d; E,b; I,4; (3).

1053. Küstner, H.
Haben Lichtstrahlen einen Einfluss auf die Hormone? Wirkung im Tier- und Pflanzenreich. Ztschr. f. Geburtsh. u. Gynäk. 103:305-317, 1932.
Sex hormones (hypophyse) very sensitive to light. Destroyed by ultra-violet and activated by infra-red. Insulin can be retarded in its action by ultra-violet but its activity returns after several hours. Red light has no special influence on insulin. Thyroxin and hypophysin can not be changed in action by either ultra-violet or red light.
I,4; (2).

1054. Küstner, H. and Eissner, W.
Beeinflussung des Insulins durch rote und ultraviolette Bestrahlung. Klin. Wchnschr., 11:499-501, 1932.
Ultra-violet will temporarily inactivate or weaken insulin. Very qualitative.
I,4; (6).

1055. Küstner, H. and Eissner, W.
Über den Einfluss von ultraviolettem Licht auf die physiologische Wirksamkeit des Insulins. Klin. Wchnschr., II:1668-1669, 1932.
Irregular results when irradiating insulin with light from mercury lamp attributed to various percentages of phenol present in factory packed material.
I,4; (3).

1056. Ludwig, F. and Ries, J. v.
Die Beeinflussung des Brunsthormons durch Röntgen;, Rot; und Ultraviolettstrahlen. Zentralbl. f. Gynäk., 55:137-139, 1931.
X-rays have no effect on the oestrus hormone. Ultra-violet light will destroy; red light will increase the activity, and will restore the activity of the hormone destroyed by ultra-violet light.
I,4; (2).

1057. Ludwig, F. and Ries, v. J.
Über die Beeinflussung einzelner Hormone und Vitamine durch verschiedenartiges Licht. Schweiz. med. Wchnschr., 61:324-331, 1931.
Qualitative investigation of the effect of ultra-violet visible, and infra-red light on Vitamin and hormone in plant and animal.
C; E,b; I,4; (3).

1058. Marchlewski, L. and Skarzynski, B.
Absorption of ultraviolet light by some hormones and allied substances. Bull. internat. Acad. polon. d. sc. et d. lett., Cl. Méd., 243-254, 1929.
Absorption spectra for: adrenaline, ephedrine, tyroxine a, b, tyrosine, o-hydroxytyrosine.
F,a; I,1,2; (2).

1059. Nitzescu, I, I.
Über den Einfluss der ultravioletten und x-Strahlen auf das Insulin. Klin. Wchnschr., 3:2343, 1924.
Insulin solution in uviol glass vials in vacuum exposed to mercury lamp under shaking. No effect after 3 hours.
See papers by other authors, where definite results with ultra-violet light were obtained.
I,4; (6).

1060. Skarzynski, B.
Zur Kenntnis des Follikelhormons. Ztschr. f. physiol. Chem., 196:19-22, 1931.
Absorption spectra of follicular hormone crystalls prepared after Marrian and after Butenandt have identical absorption spectra. (Especially around λ 2800 Å). Fresh hormone solution in KOH shows band at λ 3000 Å. After 16 hours in KOH solution both bands disappear.
I,1,2; (3).

1061. Terata, B. and Ito, R.
Über den Einfluss der Bestrahlung auf Adrenalin. I. Mitt. Über die Einwirkung der ultravioletten Strahlen (der künstlichen Höhensonne) und der Sonnenstrahlen auf Adrenalin. Folia pharmacol. japan, 12:5-6, 1931.
Adrenalin irradiated with the quartz Hg lamp was activated if irradiated a short time; and inactivated if irradiated longer.
I,4; (6).

1062. Tokumitu, Y. and Toyota, G.
Interrelationship between non-specific cell activity and hormones with special reference to the ultraviolet rays and the hormone of the spleen. Tr. Jap. Path. Soc., 21:191-193, 1931.
In Japanese.
I,4; (3).

1063. Toyoda, G.
The splenic hormone and its influence on Thrombogtogenesis after ultra-violet ray radiation. J. Chosen M.A., 22:45-47, 1932.
In Japanese.
I,4; (3).

1064. Vacek, T.
On the photo-oxidation of adrenaline. Biochem. J. 21:457-459, 1927.
Ultra-violet causes an acceleration of the oxydation of adrenalin.
I,4; (3).

1065. Vacek, T.
Sur la photo-oxydation de l'adrénaline. Compt. rend. Soc. de biol., 97:1739-1741, 1927.
Different commercial adrenalin products were exposed in solution in quartz vessel to the light of a quartz-mercury-vapor lamp, and the oxygen uptake determined.
I,4; (6).

1066. Wels, P.
Der Einfluss des bestrahlten Serums auf die Gefässwirkung des Adrenalins. Arch. f. exper. Path. u. Pharmakol., 138:151, 1928.
Ultra-violet irradiated cattle serum contains substance which is antagonistic to effect of adrenalin. Antagonist does not pass ultra-filter. (Short notice only).
A,c; F,a; G,b; I,4; (3).

1067. Winterstein, A. and Schön, K.
Chemie der Vitamine und Hormone. Ergebn. d. Hyg., Bakt., Immuntätsforsch. u. exper. Therap., 14:436-537, 1933.
Review. Large reference list.
C; H,c; I,1,2,4; (4).

See also:

44, 219, 248, 367, 633, 676, 832, 1219, 1236, 1279, 1295, 1308, 1975, 2371, 2573, 3228, 3300.

E. CHLOROPHYLL

a. Chlorophyll proper

1068. Baly, E.C.C.
Photosynthesis. Introductory Address. Tr. Faraday Soc., 27:545-551, 1931.
E,b; I,1,2,4; (4).

1069. Burns, G.R.
The long and short wave-length limits of photosynthesis. Science, 78:130, 1933.
Preliminary note.
I,1,2,4; (3).

1070. Conant, J.B. and Armstrong, R.F.
Studies in the chlorophyll series. X. The esters of chlorine. J. Am. Chem. Soc., 55:829-839, 1933.
I,1,2; (1).

1071. Conant, J.B. and Bailey, C.F.
Studies in the chlorophyll series. IX. Transformations establishing the nature of the nucleus. J. Am. Chem. Soc., 55:795-800, 1933.
Further work on the structure of the chlorophyll molecule.
I,1,2; (1).

1072. Conant, J.B. and Dietz, E.M.
Structural Formulae of the Chlorophylls. Nature, 1:131, 1933.
I,1,2; (2).

1073. Conant, J.B. and Dietz, E.M.
Studies in the chlorophyll series. XI. The position of the methoxyl group. J. Am. Chem. Soc., 55:839-849, 1933.
I,1,2; (1).

1074. Deleano, N.T. and Diok, J.
Eine neue Methode zur Bestimmung des Chlorophylls. Biochem. Ztschr., 268:317-321, 1934.
VII; (3).

1075. Dhéré, C.
Sur le spectre de fluorescence de la protochlorophyll. Compt. rand. Acad. d. sc., 192:1496-1499, 1931.
Fluorescence bands of protochlorophyll and chlorophyll around λ 6400 Å investigated. Protochlorophyll has a band in methyl alcohol at λ 6430 Å, in ethyl alcohol at λ 6265 Å, chlorophyll α at λ 6625 Å, and chlorophyll β at λ 6470 Å.
F,b; I,1,2; II,2; ( ).

1076. v.Euler, H. and Hellström, H.
Spektrometrische Messungen an Alkoholextrakten der Laubblätter von Chlorophyllmutanten der Gerste. Ztschr. f. physiol. Chem., 208:43-49, 1932.
I,1,2; (3).

1077. Fischer, H. and Hendschel, A.
Über Phyllobombycin und den biologischen Abbau der Chlorophylle. Ztschr. f. physiol. Chem., 198:33-42, 1931.
A,e; F,b; I,1,2; (2).

1078. Fischer, H. and Hendschel, A.
Über Phylloborelycin und Probophorbide. Ztschr. f. physiol. Chem., 206: 255-278, 1932.
Further work about the biological destruction of chlorophyll.
F,b; I,1,2;

1079. Fischer, H. and Hendschel, A.
Gewinnung von Chlorophyllderivaten aus Elefanten-und Menschenexkrementen. III. Mitt. über den biologischen Chlorophyllabbau. Ztschr. f. physiol. Chem., 216:57-67, 1933.
Changes chlorophyll undergoes in digestion discussed. Absorption spectra for different compounds given.
A,e; I,1,2; (1).

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Über Phyllo- und Pseudo-phyllo-erythrin. Zur Kenntnis der Chlorophylle. XV. Liebigs Ann., 485:1-25, 1931.
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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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F,b; I,1,2; (2).

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Zur Kenntnis der Chlorophylle. XXXVIII. Über die Aufspaltung von Chlorophyll a und seinen Derivaten durch Diazomethan. Krystallisiertes allomisiertes Äthylphäophorbid a. Liebigs Ann., 506:107-123, 1933.
F,b; I,1,2; (2).

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Zur Kenntnis der Chlorophylle. XXXIX. Katalytische Hydrierungen in der Chlorophyllreihe. Liebigs Ann., 506:123-157, 1933.
F,b; I,1,2; (2).

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Irradiation of chlorophyll and hematoporphyrin with mercury-vapor lamp produces compound which has spectral characteristics of urobiline.
F,b; I,4,1,2; II,2; (2).

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Über das ultraviolette Absorptionsspektrum des Chlorophylls. Ann. Physik, V.F., 4:450-452. 1930.
I,1,2; (2).

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The ultraviolet absorption spectrum of chlorophyll in alcoholic solution. Biochem. J., 22:777-778, 1928.
I,1,2; (3).

1103. Marchlewski, L.
Sur la question de la parenté chimique entre le pigment du sang et la chlorophylle. Bull. Soc. Chem. biol., 37:340, 1925.
A,b; F,b; I,1,2; (3).

1104. Marchlewski, L.
Studien in der Chlorophyllgruppe XX. Marchlewski, L. and Urbanczyk, W. Über die Umwandlung des Chlorophylls im tierischen Organismus. Biochem. Ztsch., 263:166-172, 1933.
Resorption of chlorophyll in animal body proceeds very slowly. Only proof that it takes place at all brought by presence of phylloerythrin in the bile. Authors feel that Abderhalden's suggestion that chlorophyll can be used by the animal for production of blood pigments at present entirely unfounded. Interesting paper suggesting several problems.
A,b; I,1,2; (2).

1105. Marchlewski, L. and Szymanski, A.
Studies in the chlorophyll group. Bull. internat, Acad. polon. d. sc. et d. lett., Cl. méd., 119-129, 1929.
Absorption spectra for phytol, Cu-neo-chlorophyll, Cu-allo- -prophyllotaonine, Cu-allo and neo- -prophyllotaonines.
F,b; I,1,2; (2).

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The investigation of pigments of the living photosynthetic cell. Contributions to Marine Biology, Stanford University Press, 170-187, 1930.
Interesting review.
F,a; I,1,2,4; (4).

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Der Zustand des Chlorophylls in der lebenden Pflanze. Biochem. Ztschr., 183:135-152, 1927.
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II,2; (2).

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Modellversuche zur Frage der Eisenbeteiligung an der Kohlenassimilation der grünen Pflanzen. Biochem. Ztschr., 183:153-175, 1927.
Author could obtain increase of speed of photooxidation of benzidin through eosin by adding chlorophyll. Only very small quantities of iron salts necessary to obtain large increase in benzidin photooxidation.
I,1,4,5; II,2; (2).

1109. Padoa, M. and Vita, N.
Über die Wirkung von Kohlenoxyd auf frische Pflanzen. Untersuchungen über die Absorptionsspektra der Chlorophylle a und b in Gegenwart von CO, N_2, O_2, CO_2. Biochem. Ztschr., 244:296-302, 1932.
Solutions of chlorophyll a and b as well as a and b alone treated with N_2, O_2, CO_2, and CO and absorption spectra observed. Changes in absorption spectra observed especially with O_2, CO_2 and CO, which indicate formation of "loose" compounds. Apparently CO is bound most firmly. Fits very well with fact that assimilation is stopped by CO.
E,b; I,1,2,4; (2).

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Photoaktivität des Chlorophylls. Strahlentherapie, 45:115-124, 1932.
Roffo understands by photoactivity emanation of gas which will leave impressions on photographic plate. Gas is only given up if material has been exposed to light, previous to photographic plate test. Phenomenon discussed in relation to chlorophyll. (Good bibliography.)
I,4; II,5; VII; (3).

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Occurrence of decomposition products of chlorophyll. I. Decomposition of chlorophyll in the digestive system of the cow. J. Am. Chem. Soc., 54:4702-4706, 1932.
Porphyrins, decomposition products of chlorophyll, found in stomach of cow and sheep.
F,b; I,1,2; (2).

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Photosynthesis. Pp. 382. Am. Chem. Soc. Monograph Series, New York; Chem. Catalog. Co., 1926.
Best book in English on photosynthesis.
E,b; I,1,2,4; II,2; (1), (4).

1113. Stiles, W.
Photosynthesis. The assimilation of carbon by green plants. Pp. 211. London: Longmans, Green and Co.. 1925.
E,b; I,1,2,4; (4).

1114. Stoll, A. and Wiedemann, E.
Die Zusammensetzung des chlorophylls. 3. Mitteilung über Chlorophyll. Helvet. Chim. Acta, 16:183-206, 1933.
I,1,2; VII; (3).

1115. Stroll, A. and Wiedemann, E.
Die optische Aktivität des Chlorophylls. 4. Über Chlorophyll. Helvet. Chim. Acta, 16:307-314, 1933.
I,1,2; III,1; (2).

1116. Stoll, A. and Wiedemann, E.
V. Über Chlorophyll. Über Chlorophyll a, seine phasepositiven Derivate und seine Allomerisation. Helvet. Chim. Acta, 16:739-772, 1933.
F,b; I,1,2; (2).

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Über biologische Abbauprodukte des Chlorophylls in tierischen Konkrementen. Ztschr. f. physiol. Chem., 220:89-96, 1933.
A,e; I,1,2; (3).

1118. Treibs, A. and Herrlein, F.
Zur Kenntnis der Chlorophylle. XXXVI. Über Verdo-porphyrin und den Abbau des Chlorophylls durch Alkali. Liebigs Ann., 506:1-19, 1933.
F,b; I,1,2; (2).

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Die Blattfarbstoffe. Abderhalden's Handb. d. biol. Arbeitsmeth., Abt. I., Teil 11, Heft 1, 1-70, 1924.
Good review of leaf pigments.
F,b; I,1,2; (1), (4).

1120. Winterstein, A. and Stein, G.
Fraktionierung und Reindarstellung organischer Substanzen nach dem Prinzip der chromatographischen Adsorptionsanalyse. II. Chlorophylle. Ztschr. f. physiol. Chem., 220:263-277, 1933.
By using sugar as means of absorption, chlorophyll a and b can be prepared. New values for wave length of absorption bands given. Method of authors especially suitable for determining smallest quantities of chlorophyll. Maxima for bands are for: Chlorophyll A λ 6630 6230 6070 5770 5340 5070 4940 4320 Å. Chlorophyll B λ 6440 6193 5940 5670 5420 5030 4560 4280 Å.
I,1,2,3; (2).

1121. Zscheile, F.P.

A quantitative spectrophotoelectric analytical method applied to solutions of chlorophylls a and b. J. Physical Chem., 38:95-102, 1934.

By spectro-photoelectric method, quantitative light absorption data were obtained for pure chlorophylls a and b and their mixtures. Percentage composition of unknown mixtures of components a and b determined with accuracy better than 1.0%. From light absorption measurements at λ 4400 Å total chlorophyll concentration is calculated. Ratio of a to b calculated from measurements at λ 4100 Å or 4270 Å. Beer's law valid for chlorophyll solutions in 90 per cent acetone over narrow range of concentration.

H,a; I,1,2; (2).

See also:

84, 186, 188, 933, 1048, 1272, 1428, 1515, 1518, 1533, 1580, 1607, 1644, 1764, 1771, 1783, 2294, 2318, 2392, 2576, 2733, 3039.

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b. Other botanical applications.

1122. Astbury, W.T., Marwich, T.C., and Bernal, J.D.
X-ray analysis of the wall of Valonia ventricosa I. Proc. Roy. Soc., London, Ser. B., 109:443-450, 1932.
Very interesting illustration of application of x-ray method to structure of organic biological materials. The cell wall of Valonia ventricosa is found by x-ray methods to be built up of two main sets of cellulose chains, which form crystallites crossing at an angle, maintained remarkably constant through the whole thickness and over considerable area of the wall. The orientations of the cellulose chains are found in the directions of the fine crossed striae, which may be detected on the surface of the wall, when examined under the microscope. The extinction directions shown by the wall in polarised light are determined by the interfibre angle and the proportions of cellulose chains associated with each orientation. Refractive indices and optical axial angles have been measured for those areas of the wall which behave optically as single crystals. Suggestions discussed as to nature of orienting forces.
A,f; VI,1; (1).

1123. Borodin, D.N.
Energy emanation during cell division processes (M-rays). Plant Physiol., 5:119-129, 1930.
Author was able to detect mitogenetic radiation with the onion root technic.
G,c; I,5; (6).

1124. Briggs, G.E.
Experimental researches on vegetable assimilation and respiration. XXI. Induction phases in photosynthesis and their bearing on the mechanism of the process. Proc. Roy. Soc., London, B, 113:1-41, 1933.
I,1,4; (2)

1125. Byrükov, D.
Über Gurwitschs mitogenetische Strahlen. Russk. fiziol. Z., 9:499-502, 1926.
Used onion root technic with negative results.
II,5; (6).

1126. Cluzet, J. and Kofman, T.
De l'action des différentes radiations sur les anceaux de Liesegang. Compt. rend. Soc. de biol., 104:1001-1003, 1930.
Negative results were obtained with Liesegang rings and mitogenetic ray senders.
H,a; II,5; (6).

1127. Dhar, N.R. and Ram, A.
Photosynthesis in tropical sunlight. VI. The presence of formaldehyde in rainwater. J. Phys. Chem., 37:525-531,1933.
Authors found that freshly collected rainwater contains formaldehyde to extent of 0.001 to 0.00015 g. per liter. Rain preceded by sunny days contains higher percentage of formaldehyde.
I,4; (6).

1128. Dhar, N.R., Rao, G., and Ram, A.
Photosynthesis in tropical sunlight. Tr. Faraday Soc., 27:554-558, 1931.
I,1,2,4; (4).

1129. Engelmann, T.W.
Über Reizung kontraktilen Protoplasmas durch plötzliche Beleuchtung. Pflüger's Arch. f.d.ges. Physiol., 19:1-7, 1879.
I,4; (5).

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Certain leaves, after irradiation with ultra-violet light, form in addition to the necrotic pigment, water-soluble fluorescing substances. Oxygen necessary for pigment formation. Light of λ2000 to λ3000 Å most effective in pigment formation.
F,b; I,4; (3).

1131. Gerlach, Wa.
Spektralanalytische Untersuchung einer biologischen Reaktion. Sitzungsb. d. Bayer. Akad. Wiss. Math. naturwiss. Klasse, page 1-4, 1933.
With Bechhold's copper test it was possible to show with 1/10 g. of potatoe tissue that copper was replacing potassium in tissue. Importance of this fact. Excellent illustrations.
H,a; II,1; A,f; (2).

1132. Gurwitsch, A.
Die Natur des spezifischen Erregers der Zellteilung. Arch.f. mikrosk. Anat. u. Entwcklngsmechn.,
Second article from Gurwitsch on discovery of mitogenetic radiations.
II,5; (5).

1133. Gurwitsch, A.
Les problèmes de la mitose et les rayons mitogénétiques. Bull.d'histol. appliq. a la physiol., 1:486-497, 1924.
E,b; II,5; (5).

1134. Gurwitsch, A.
Einige Bemerkungen zur vorangehenden Arbeit von Herrn B. Rossmann. Arch. f. Entwcklngsmechn.d. Organ., 113:406-314,1928.
Polemic against Rossmann.
II,5; (6).

1135. Gurwitsch, A.
Die mitogenetische Strahlung aus den Blättern von Sedum (latifolium) Eine Erwiderung an G. Haberlandt. Biol. Zentralbl., 49:449-451, 1929.
Pulp from leaves of sedum latifolium radiates if left standing for 18-24 hours.
II,5; (3).

1136. Gurwitsch, A. and N.
Fortgessetzte Untersuchungen über mitogenetische Strahlung und Induktion Arch. f. mikrosk. Anat. u. Entwcklngsmechn., 103:68-79, 1924.
Early experiments with onion root detector of mitogenetic radiation. "Mitogenetic radiations are shorter than optical rays."
II,5; (5).

1137. Gurwitsch, A.
Die Fortpflanzung des mitogenetische Erregungszustandes in den Zwiebelwurzeln. Arch.f. Entwcklngsmechn. d. Organ., 124:357-368, 1931.
Speed of transmission in mitogenetic state about 30 m/sec.
II,5; (3).

1138. Gurwitsch, L.
Untersuchungen über mitogenetische Strahlen. Arch.f. mikrosk. Anat. u. Entwcklngsmechn., 103:483-489, 1924.
Description of union root (ground up) as sender of mitogenetic radiation. Mitogenetic radiation produced in root base and then transmitted to root tip.
II,5; (3).

1139. v. Guttenberg, H.
Die Theorie der mitogenetischen Strahlen. Biol. Zentralbt., 48:31-39, 1928.
Reviews negative result of Wagner and Rossmann in use of onion root in detection of mitogenetic rays.
II,5; (2).

1140. v. Guttenberg, H.
Schlusswort zur Arbeit von B. Rossmann. Arch. f. Entwcklngsmechn.d. Organ., 113:414-418, 1929.
II,5; (3).

1141. Haberlandt, G.
Über "mitogenetische Strahlung". Biol. Zentralbl., 49:226-230, 1929.
Polemic against Gurwitsch. Tissue pulp and juice of cranulacea leaves do not emit mitogenetic radiation.
II,5; (3).

1142. Haitinger, M. Linsbauer, L. and Eibl. A.
Über das Verhalten lebender und erfrorener Gehölze im ultravioletten Lichte, Biochem. Ztschr., 215:191-196, 1929.
Inner bark of branches of many wooden plants shows in filtered ultraviolet light a distinct brown fluorescence. Dried branches show this fluorescence, but branches which have been frozen do not show it.
II,2; (3).

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Lichtbräunung an Fruchtschalen. Cong. Intern. Lum. Coph., 231-238, 1932.
See later paper for detailed abstract.
A,f; I,1,2,4; (1).

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Lichtbräunung an Fruchtschalen. Strahlentherapie, 48:223-229, 1933.
The influence of short ultra-violet monochromatic light changes color of the peels of bananas or pumpkins to dark brown. This color has a striking resemblance to that of erythema in its wavelength dependence. The formation of color is made impossible by the presence of light around λ4000 Å. Pigment appears only in the presence of O_2. Enzyme poisons make pigment formation impossible.
For pigment formation there are apparently 3 factors necessary, an oxidizable substance, an oxydase, and oxygen. Under normal conditions they do not appear together but ultra-violet makes this possible.
This paper suggests a number of interesting problems.
A,f; F,b; I,1,2,4; (1)

1145. Herzog, R.O. and Hillmer, A.
Über das ultraviolette Absorptionsspektrum des Lignins und von Körpern mit dem Coniferylrest. Ztschr. f. physiol. Chem., 168:117-123, 1927.
I,1,2; (3).

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Studien über Pflanzenkolloide. XVII. Über die Peptisation der Stärke durch ultraviolette Strahlen. Kolloid-Beit., 23:377-399, 1927.
F,c; I,4; (6).

1147. Kahlenberg, L. and Closs, J.O.
On the presence of aluminium in plant and animal matter. Science, 69:186, 1929.
Found, in contrast to McCollum et al., aluminium in a large number of tissues. See extensive paper!
A.f; II,1; (3).

1148. Kahlenberg, L. and Closs, J.O.
On the presence of aluminium in plant and animal matter. J. Biol. Chem., 83:261-264, 1929.
Aluminium found in all materials investigated.
A,f; II,1; (2).

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Presence of aluminum in animal and plant matter. J. Biol. Chem., 85:783-784, 1930.
Polemic against Prof. McCollum.
A,f; II,1; (6).

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Pflanzenfarbstoffe, L. Überfuhrung von Perhydro-erocetin in Perhydro-norbixin. Helvet. Chim. Acta, 16:337-338, 1933.
F,b; VII; (3).

1151. Karrer, P., Benz, F., and Stoll, M.
Pflanzenfarbstoffe. XLIX. Synthese des Perhydro-erocetins. Helvet. Chim. Acta, 16:297-302, 1933.
F,b; I,1,2; (2).

1152. Karrer, P. and de Menson, G.
Pflanzenfarbstoffe.XLVIII. Über Violanin. Helvet. Chim. Acta, 16: 292-296, 1933.
F,b; I,1,2; (3).

1153. Karrer, P., Morf, R., and Walker, I.
Konstitution des α-Carotins. Pflanzenfarbstoffe. LII. Helvet. Chim. Acta, 16:975-977, 1933.
F,b; VII; (3).

1154. Karrer, P. and Nothafft, A.
Pflanzenfarbstoffe.XLIII. Zur Kenntnis der Carotinoide der Blüten. Helvet. Chim. Acta, 15:1195-1204, 1932.
I,1,2; F,b; (2).

1155. Karrer, P. and Takahashi, T.
Pflanzenfarbstoffe.XLVII. Über die Isomerieverhältnisse beim Biin. Bemerkungen zu den Theorien über die Bildung von Caratinoidpigmenten in der Pflanze. Helvet. Chim. Acta, 16:287-292, 1933.
F,b; I,1,2; (2).

1156. Karrer, P. and Takahashi, T.
Methylierungsprodukte des Zeaxanthins. Helvet. Chim. Acta, 16:1163-1165, 1933.
F,b; I,1,2; (2).

1157. Karrer, P. and Walker, O.
Pflanzenfarbstoffe.LI. Reines α-Carotin. Helvet. Chim. Acta, 16:641-743, 1933.
F,b; I,1,2; (3).

1158. Karrer, P., Zubrys, A., and Morf, R.
Beitrag zur Kenntnis des Xanthophylls und Violaxanthins. Helvet. Chim. Acta, 16:977-979, 1933.
F,b; I,1,2; (3).

1159. Kisliak-Statkewitsch, M.
Das mitogenetische Strahlungsvermögen des Kartoffelleptoms. Arch. f. Entwcklngsmechn.d. Organ., 109:283-286, 1927.
Leptom bundles of potatoes emit mitogenetic rays.
II,5; (3).

1160. Kosaka, H.
Die Beziehungen zwischen den verschiedenen physiologischen Erscheinungen der Pflanzen und den an verschiedenen Vegetationsorganen in Erscheinung tretenden Farbstoffen. J. Dept. of Agric., K.I.U., 4:127-160, 1934.
I,1,2; (6).

1161. Kowarzk, H.
Über die Fernwirkung von Zwiebelsohlenbrei auf Kolloide und über den Nachweis mitogenetischen Strahlungen. Acta biol. exper. (Warszawa), 6:29-34, No. 2, 1930.
Negative results with Liesegang rings as detector for mitogenetic radiation.
II,5; (6).

1162. Kuhn, R. and Lederer, E.
Taraxanthin, ein neues Xantophyll mit 4 Sauerstoffatomen. Ztschr., f. physiol. Chem., 200:108-114, 1931.
F,b; I,1,2; (2).

1163. Kuhn, R., Winterstein, A., and Lederer, E.
Zur Kenntnis der Xanthophylle. Ztschr. physiol. Chem., 197:141-160, 1931.
Detailed discussion of xanthophyll of different sources, also of luthein, zeaxanthein. Absorption spectra, optical rotation, preparation, etc.
F,b; I,1,2,4; IV,1; (2).

1164. Loos, W.
Untersuchungen über mitogenetische Strahlen. Jahrb.f.wissensch.Bot., 72:611-644, 1930.
Apparently very thorough work. Loos describes his technique very well. Onion root detector and sender gave positive results. Mitotin-mitotase problem checked. Variation of effect checked. Photographic experiments gave negative results.
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II,5; (3).

See also:

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918, 948, 954, 955, 1052, 1057, 1068, 1109, 1112, 1113, 1133, 1249,
1360, 1388, 1389, 1420, 1456, 1461, 1493, 1548, 1571, 1585, 1630, 1691,

1729, 1736, 1740, 1764, 1781, 1855, 2012, 2063, 2078, 2324, 2326, 2392,
2410, 2439, 2514, 2525, 2571, 2593, 2627, 2628, 2687, 2693, 2733, 2791,
2883, 2938, 2969, 3100, 3108, 3210, 3246, 3313.

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